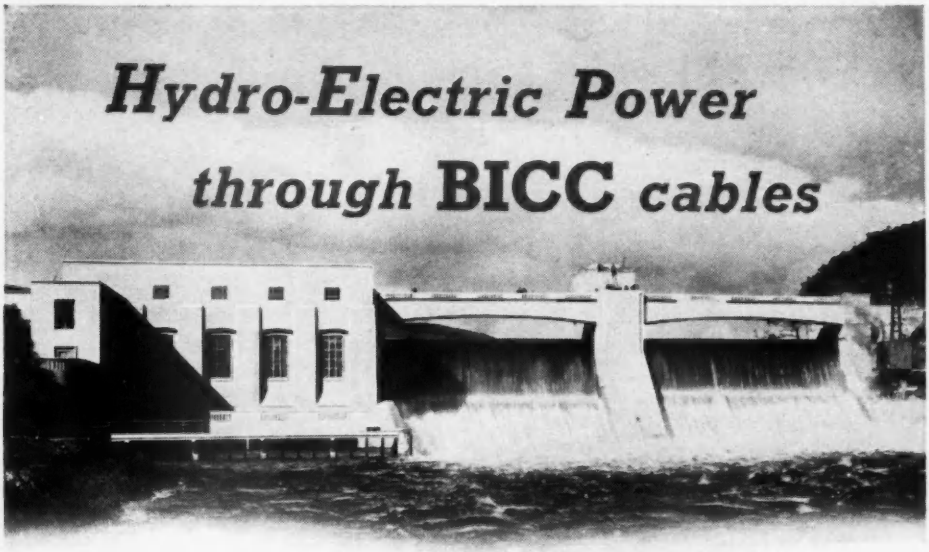
ELECTRICAL TIMES

THURSDAY
3 APRIL
1952
NINEPENCE



Above: General view of Pitlochry Generating Station

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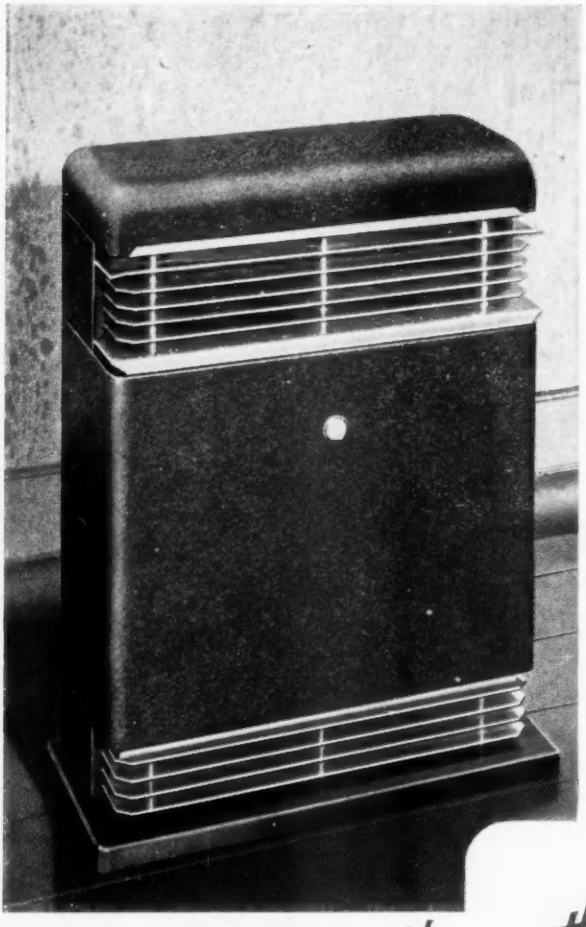

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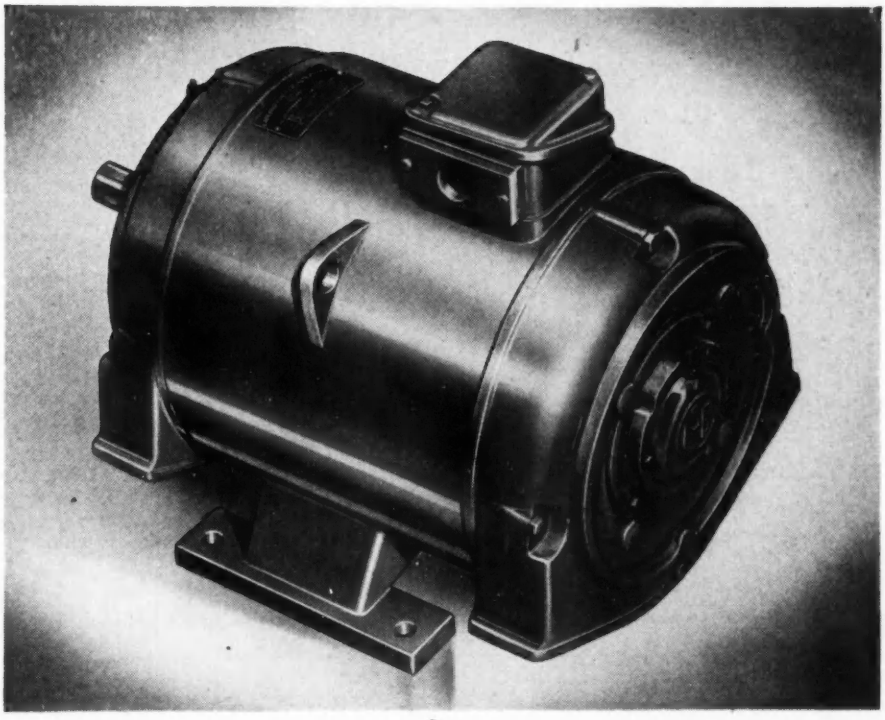

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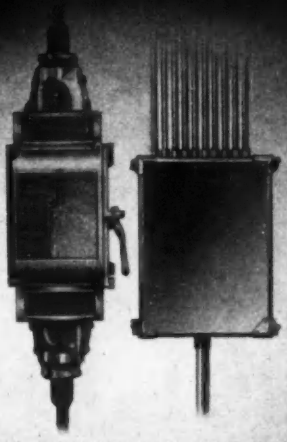

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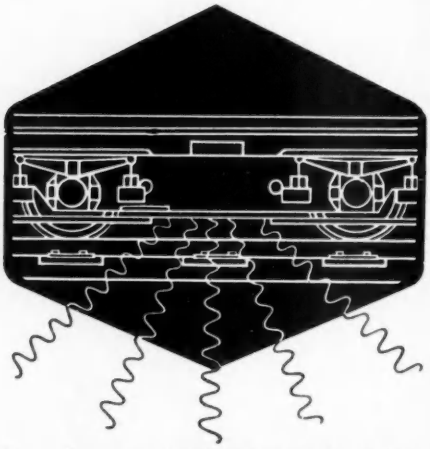

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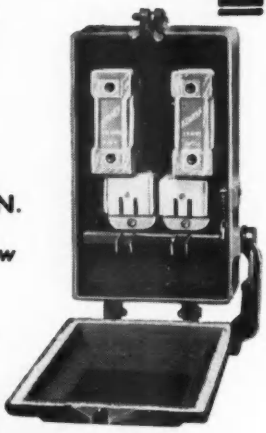

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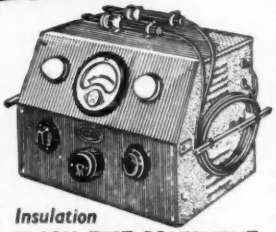

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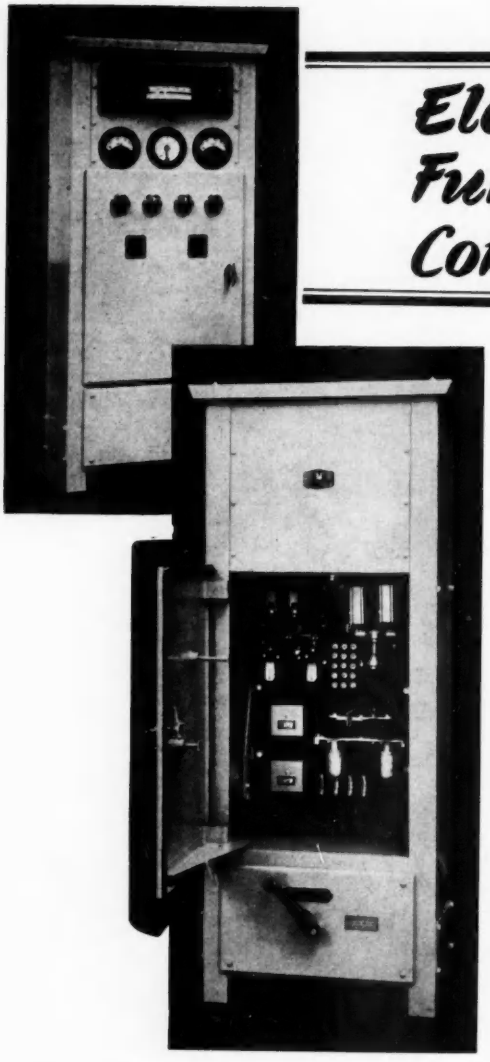

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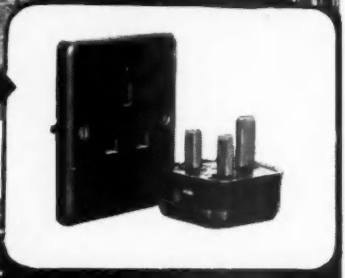

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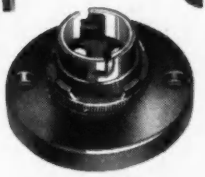

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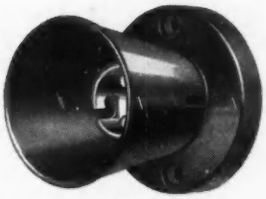

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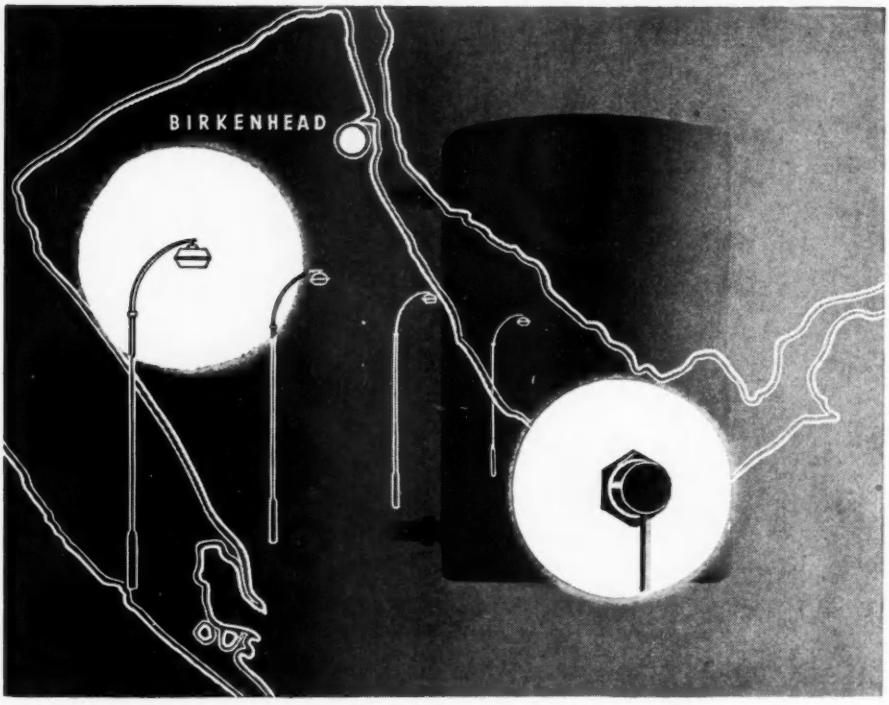

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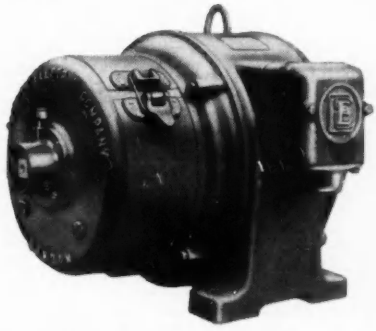

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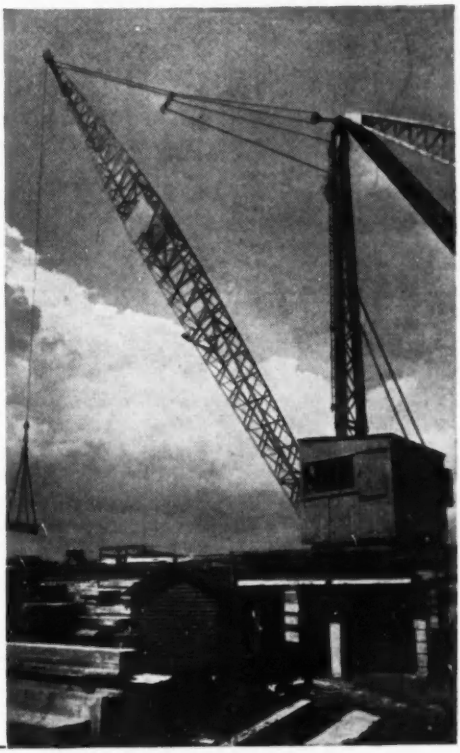

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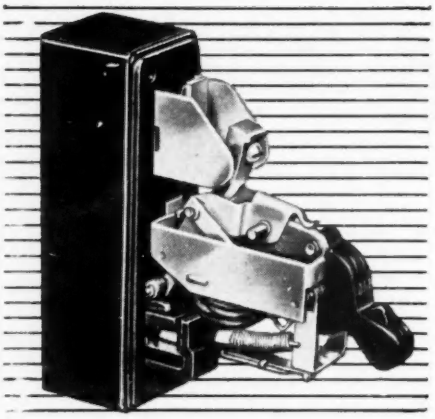

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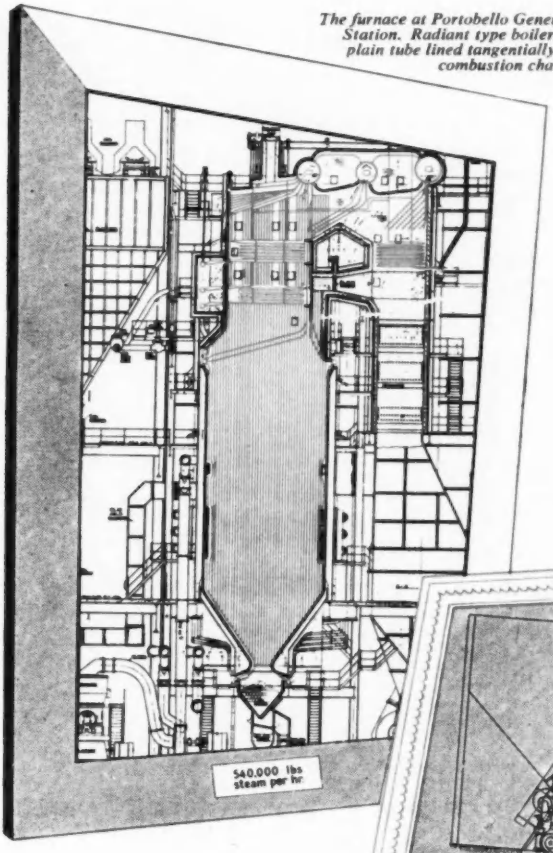

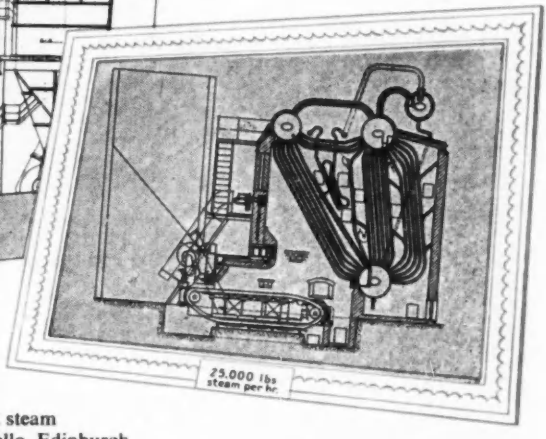

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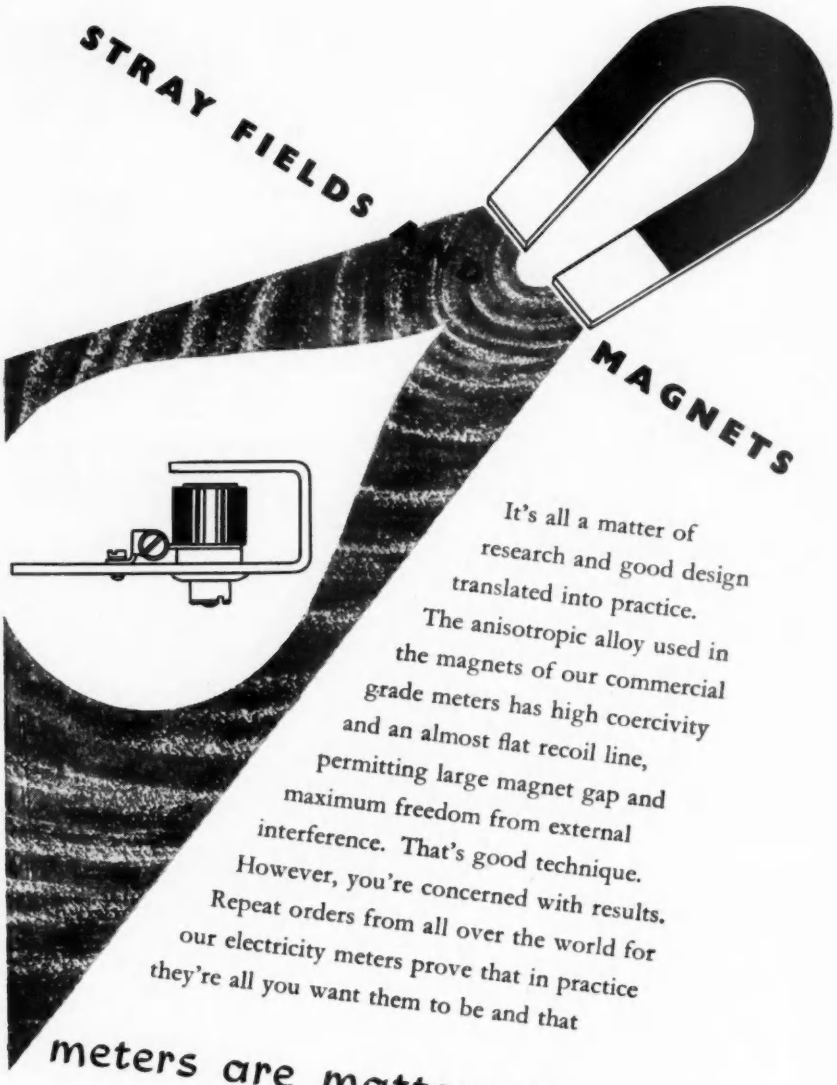

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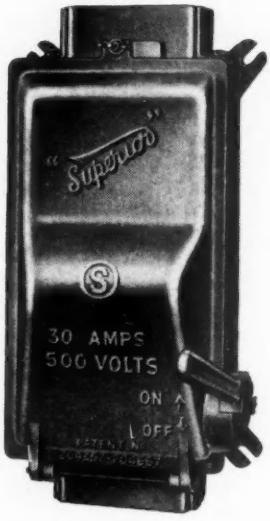

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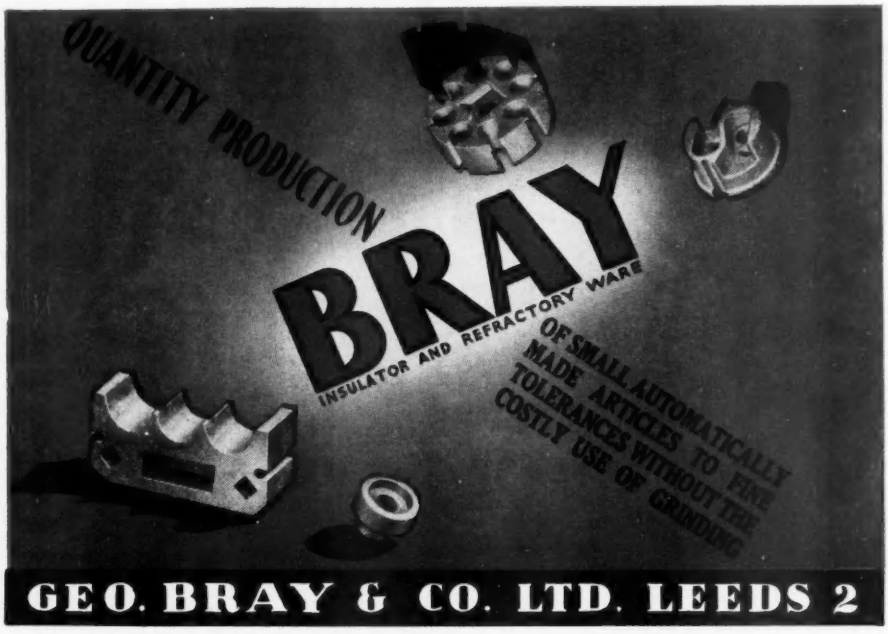
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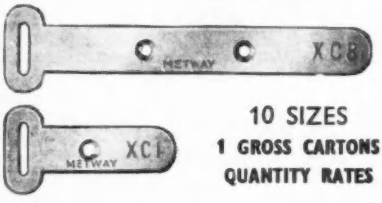

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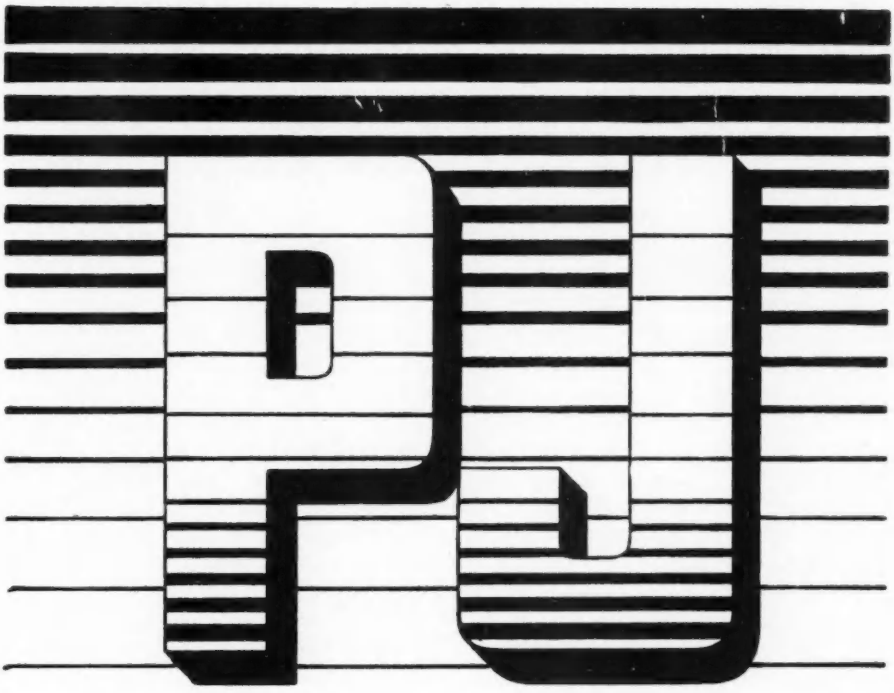

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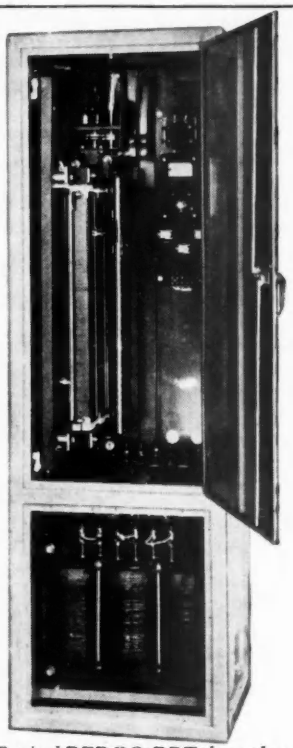

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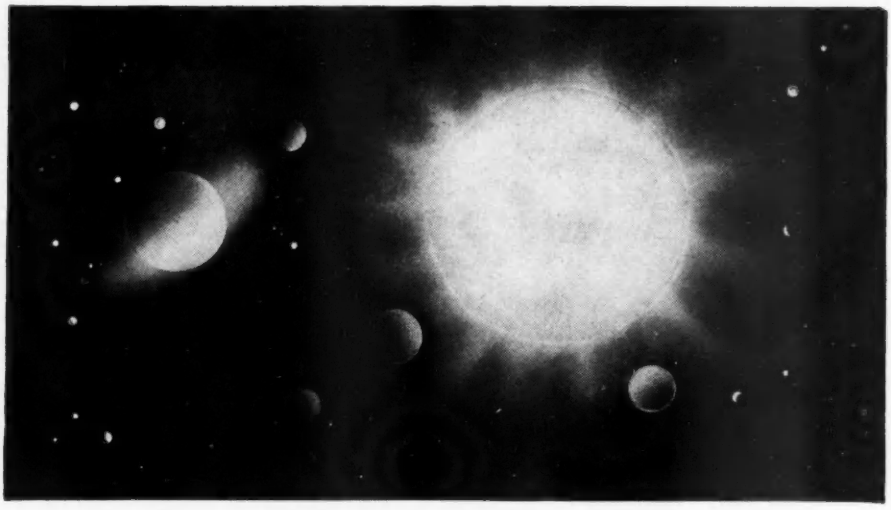

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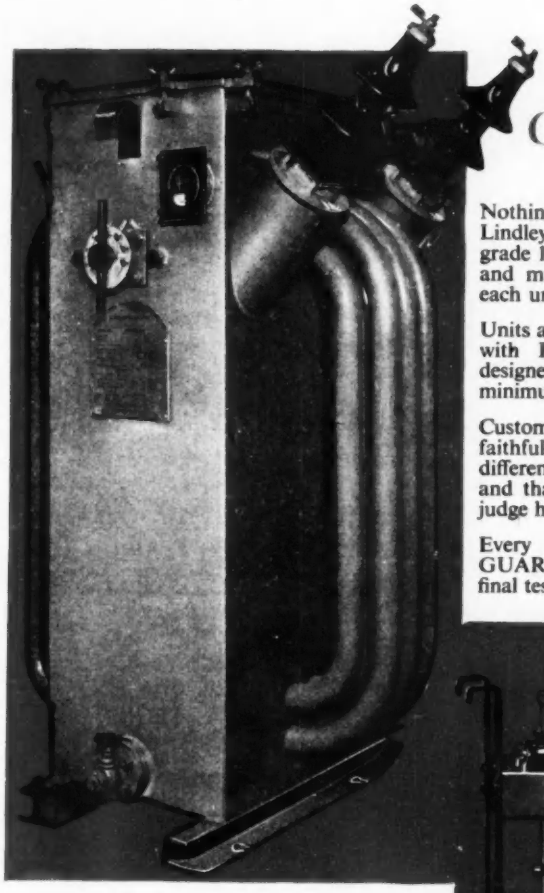

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Nothing is skimped in the manufacture of Lindley Thompson Transformers. Top grade 100% British materials are employed and mass production is not encouraged: each unit design is treated individually.

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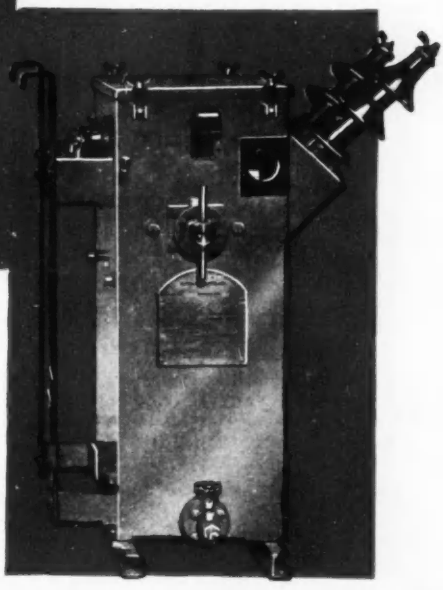

Outdoor platform pole type
100 kVA single phase, 50 cycles.
Voltage ratio 11,000/250 plus 250.

25 kVA. Outdoor pole type, single phase, 50 cycles. Voltage ratio 11,000/250 plus 250, fitted with hangers. Each transformer is fitted with off-load tapping switch, oil level indicator, oil drain valve and thermometer pocket.

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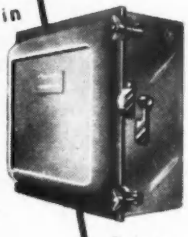

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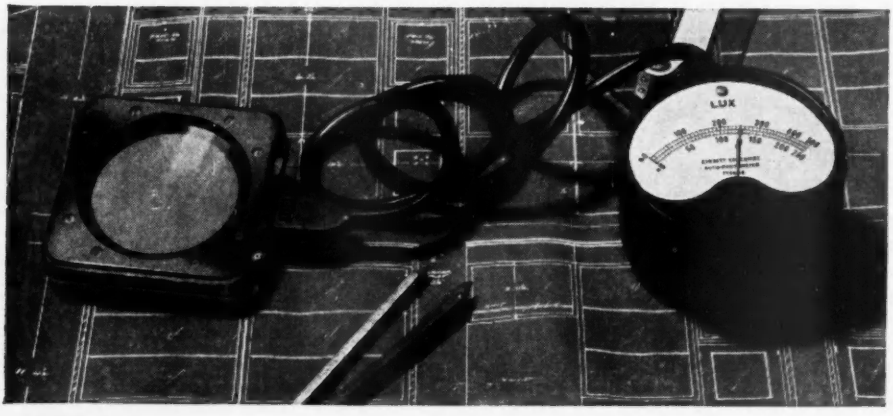

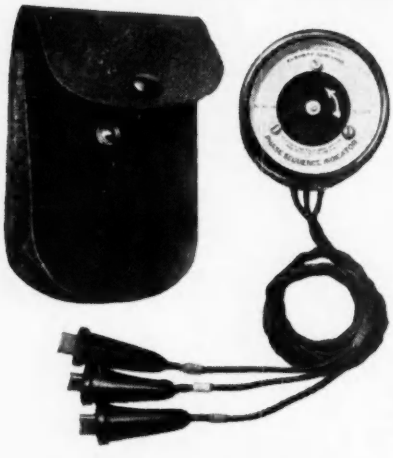

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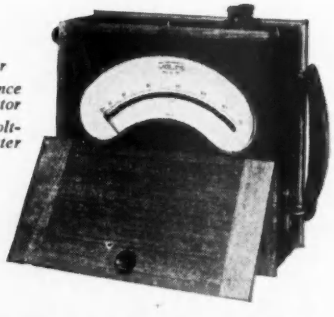

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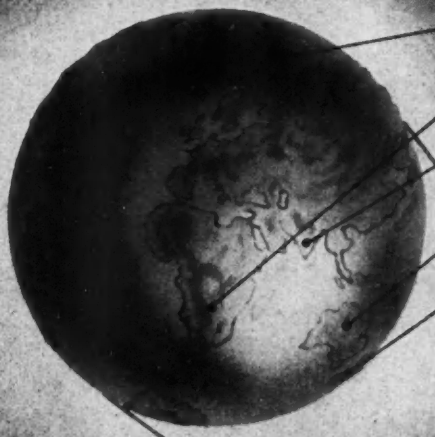

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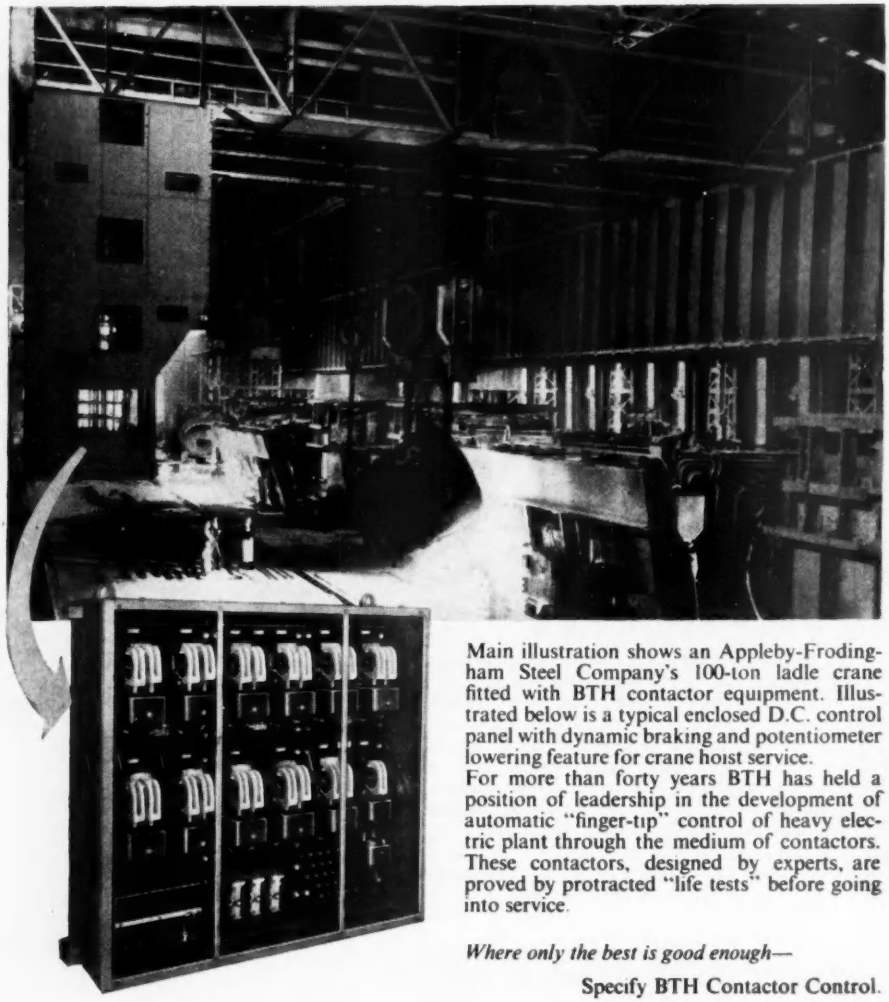

Main illustration shows an Appleby-Frodingham Steel Company's 100-ton ladle crane fitted with BTH contactor equipment. Illustrated below is a typical enclosed D.C. control panel with dynamic braking and potentiometer lowering feature for crane hoist service.

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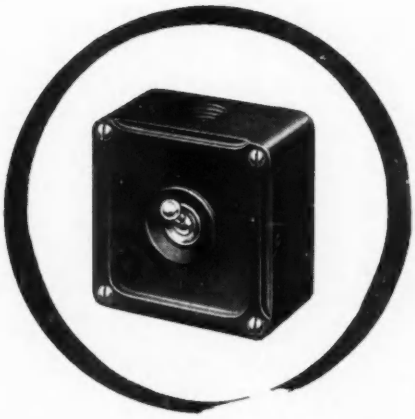

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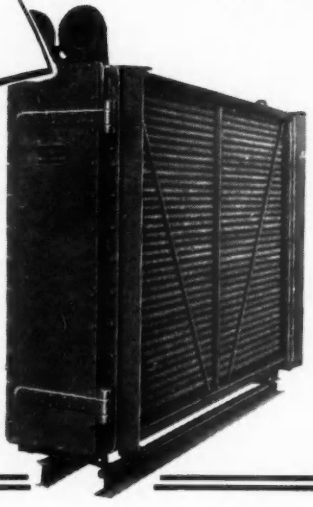

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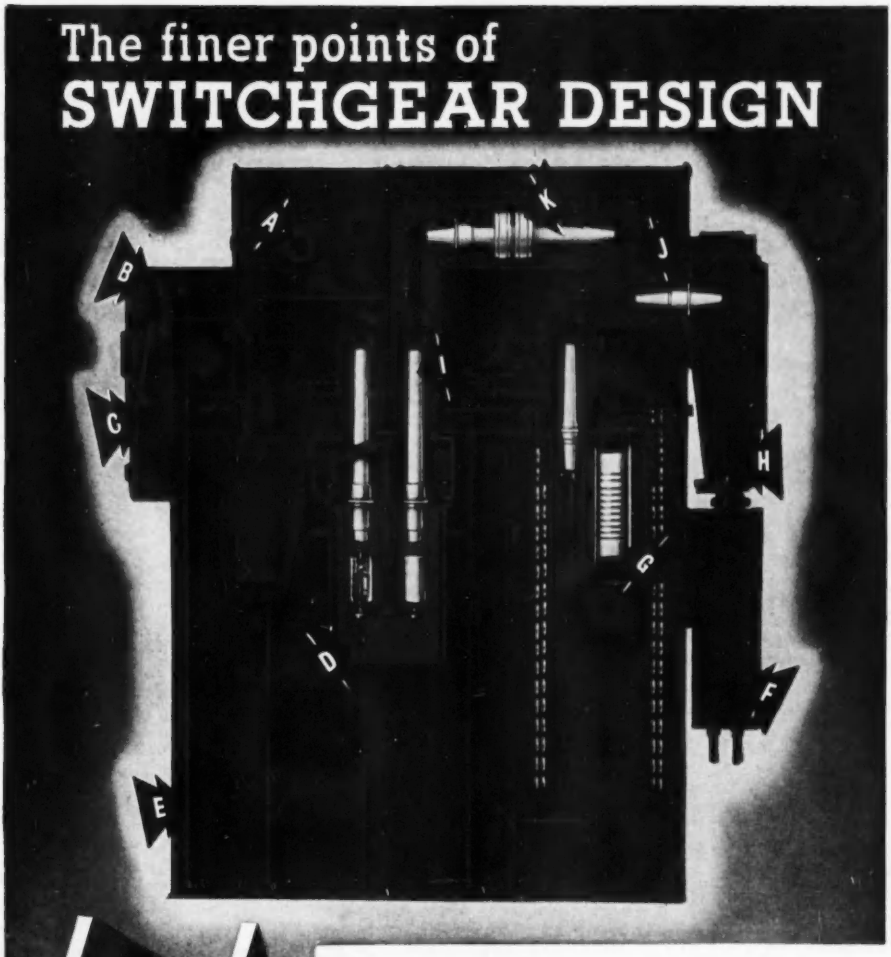

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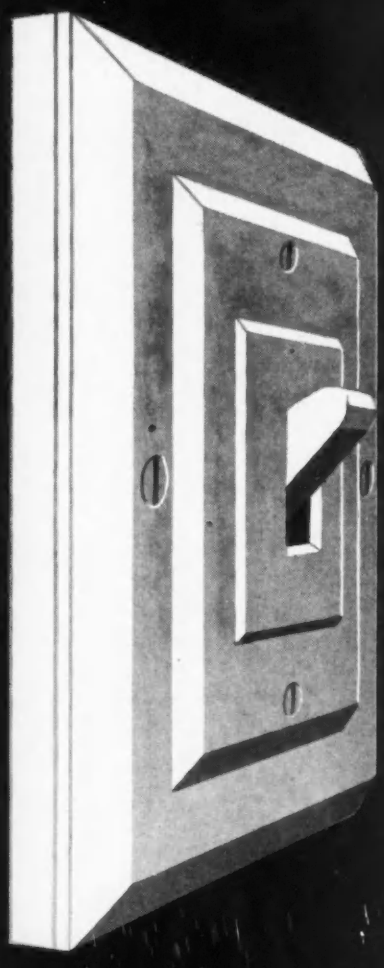

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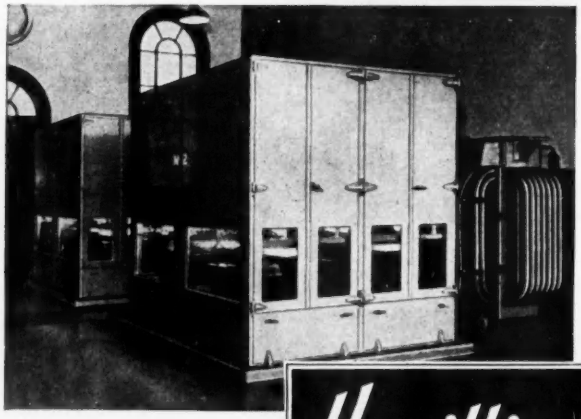

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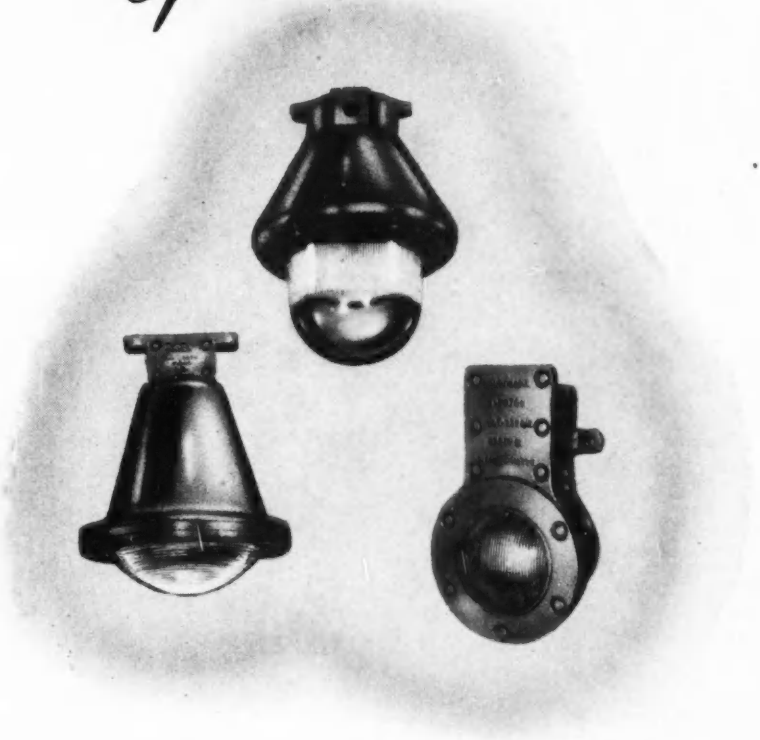

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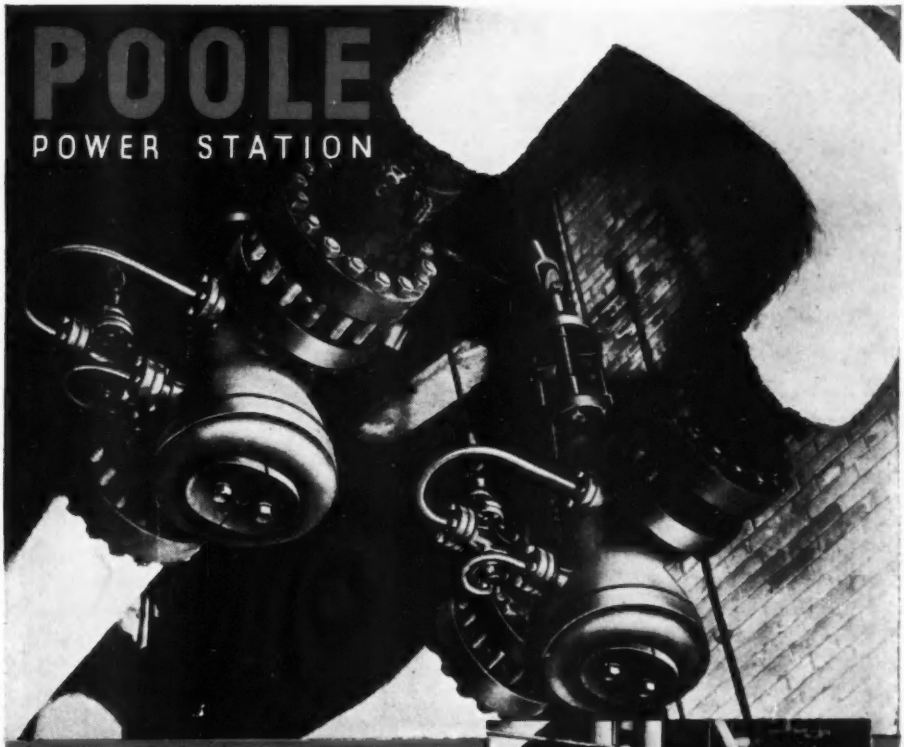

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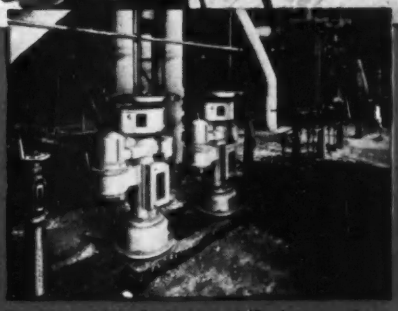

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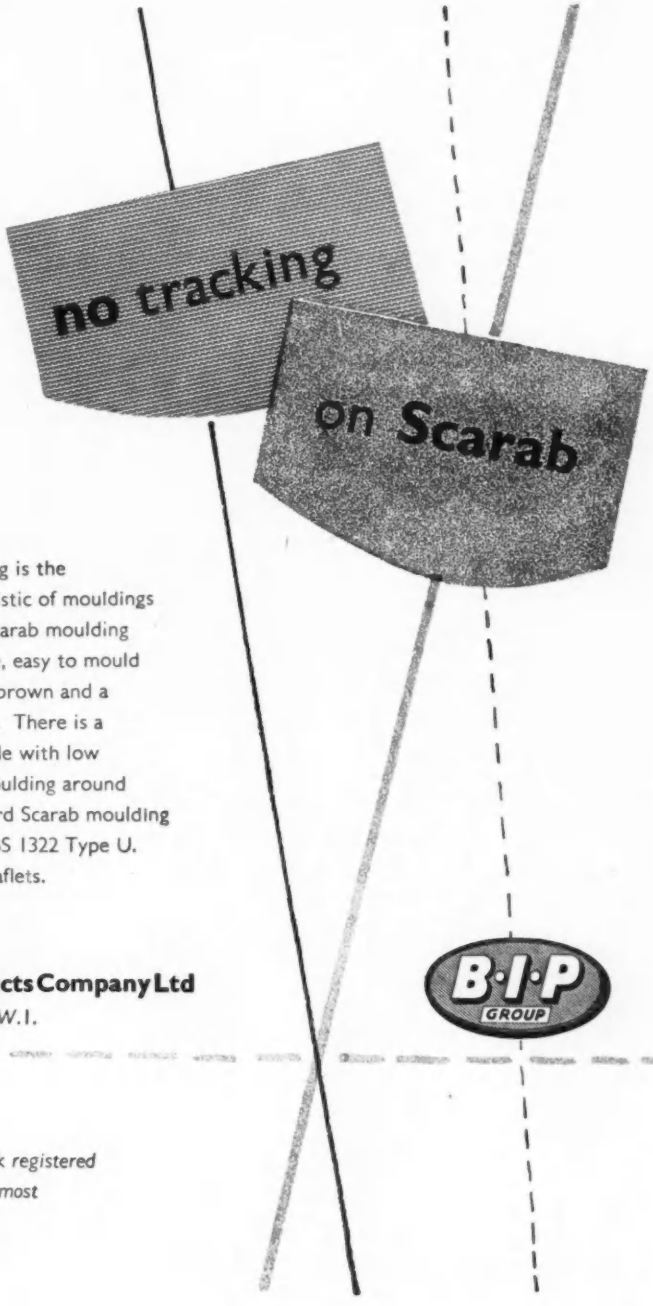

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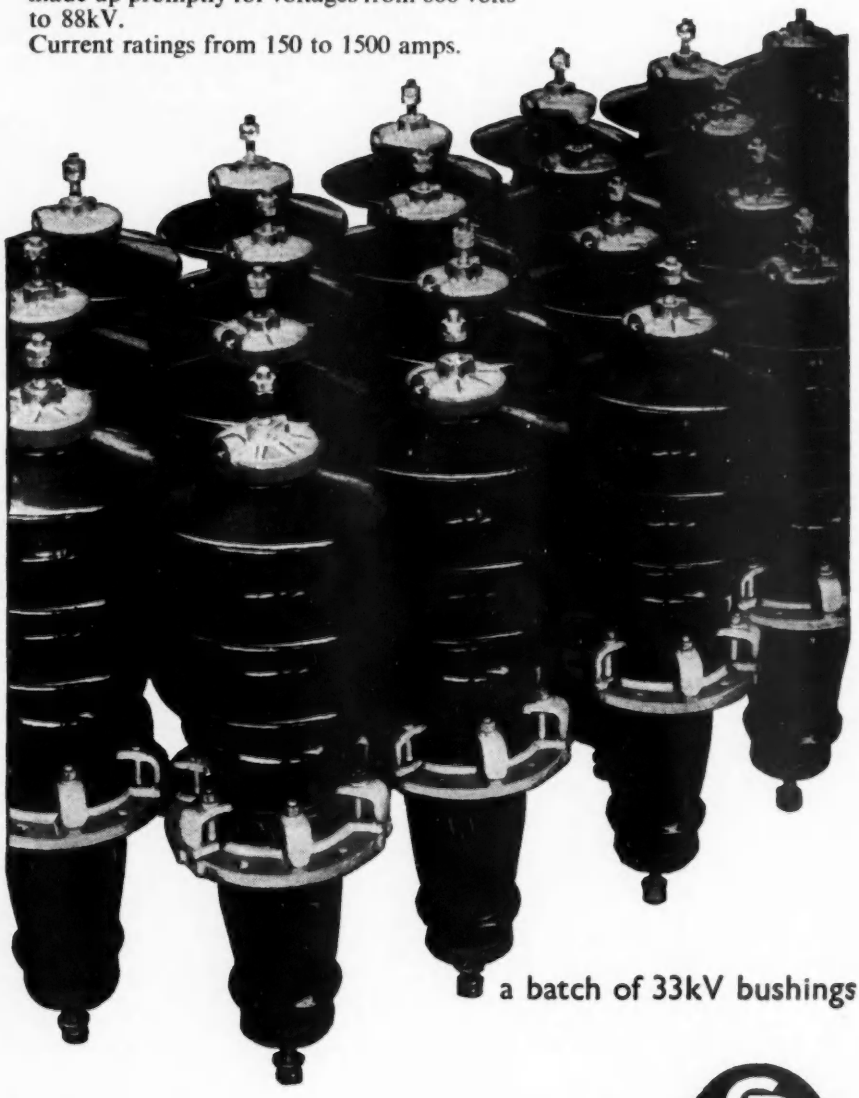

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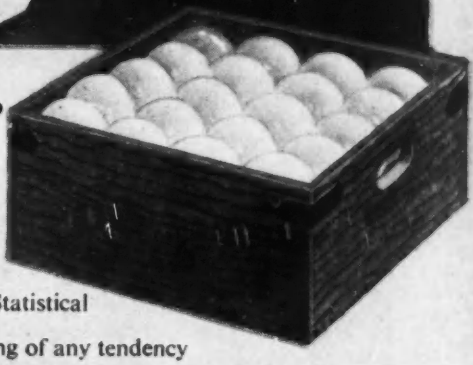

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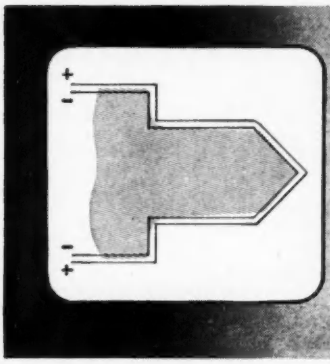

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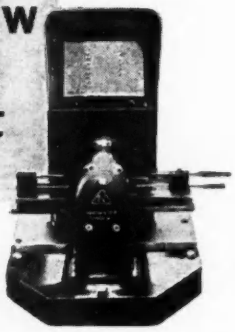

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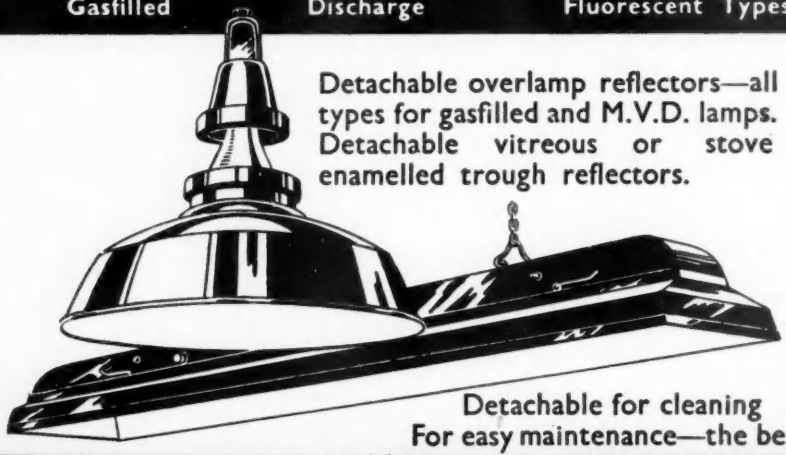

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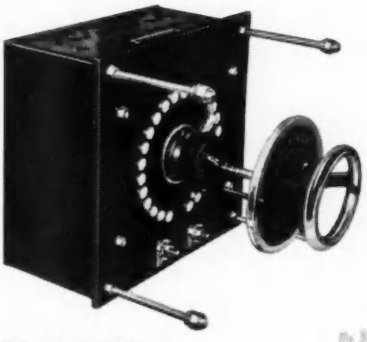

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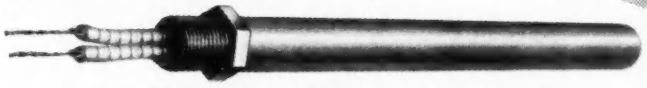

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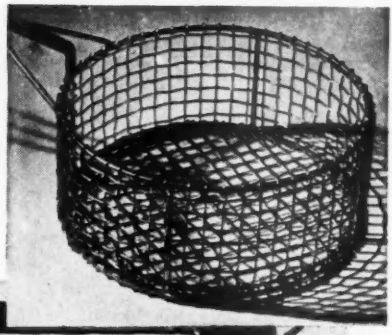

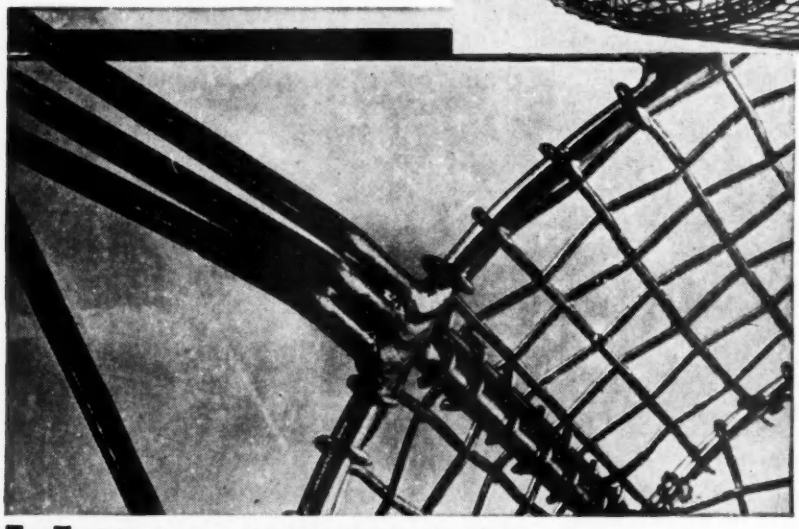

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ELECTRICAL TIMES

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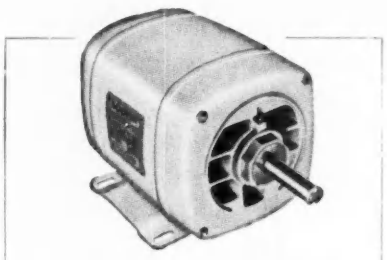

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Editorial

MR. NABARRO'S FAITH

THOSE of us who felt that the errors of Mr. Nabarro's first pamphlet on fuel economy were to be condoned on the grounds of over-exuberant treatment of a newly-found problem, cannot find a similar excuse for his latest publication, "Ten Steps to Power." True, he has learned much in the interim, but there is the same superficial study of the problem, with misleading figures and overwhelming bias against electricity to an extent that is not even supported by his own anti-electrical evidence. He has also become more sweeping in his statements and careless of inconsistencies. The theme he proposes goes far beyond a straightforward attack on electricity for domestic heating and cooking; hydro-electric schemes (apparently operating on 30% load factor) are condemned equally with modern power stations. Mr. Nabarro's solution is the wholesale use of pass-out turbines in industry and for public supply, when larger numbers of smaller stations within urban areas will be used for district heating. Such stations, we are informed, would involve only a slight increase in capital outlay. In a case which he offers as evidence for the economy of pass-out sets, the capital costs, including auxiliary plant and building, works out at under £37 a kW installed: a truly phenomenal figure, more suggestive of pre-war than post-war. No wonder Mr. Nabarro looks askance at the £60 to £65 a kW for large power stations today.

COUNTER-ATTACK IS URGENT

BUT to provide the necessary comment on all Mr. Nabarro's statements would require a pamphlet as large as the original. Those familiar with power economics, however, will have no difficulty in providing their own comment; the danger lies amongst the less informed public at which this pamphlet is directed. Further, Mr. Nabarro aims at forming an action group within Parliament to raise the issue of his fuel policy on all relevant occasions. It is clear, therefore, that before his views achieve wider acceptance, steps should be taken to see that they are considered only in their right perspective. This is hardly likely to be done by the gas or solid fuel industries, since, although they may be aware of the fallacies, their interests lie in parallel channels. It is only from the B.E.A. that the answer must come. Naturally, to reply directly to Mr. Nabarro's claims would enhance their value to a level they do not deserve. But no longer can the supply industry afford to allow a single opportunity to pass of putting before the public a proper appreciation of the fundamental factors concerning power supply.

MAN AND MACHINE

IN the many automatic systems which today control plant and processes, there almost invariably exists a stage at which information has to be presented to the men and women in charge. On either side of this human link, mathematical analysis and refinements of design experience have combined to keep down errors to a known minimum, and to raise efficiency. Such, however, is the complexity of man as a machine, that too often the designer does not attempt rationally to secure maximum effectiveness at the point where the human element intervenes. Something of what modern techniques of experimental psychology can do to improve this position was shown in an article which appeared in our pages last August, when Mr. W. H. DUNKLEY discussed the special problem of the system control room. So important a matter quickly attracted widespread interest amongst engineers. Many requests for more information came from our readers all over the world, and it is in response to these that we introduce this week a series of articles in which Mr. BERNARD GIBBS will discuss the findings of recent psychological research and relate them to

various aspects of engineering design. As Mr. Gibbs is actively engaged on such research, and as he has the co-operation of Mr. Dunkley on many practical details, we are confident that this study will be a very real help to industry.

ELECTRIC GASIFICATION

EXPERIMENTS on the gasification of coal *in situ* underground have been proceeding in various parts of the world for some years. Between the projects in the U.S.A. and in Britain, close liaison has been maintained, and for much of the time somewhat similar methods have been adopted for initiating combustion in the chosen seams. Recent reports from the United States, however, indicate that a radical departure from previous practice has proved promising. As explained elsewhere in this issue, the basic idea involved in this new technique is to use electric resistance heating, with a current passing through the coal between two electrodes sunk to the level of the seams. In essentials, this is another application of an electrical method of manufacturing coke which we described a year ago and which has been applied with some success both in America and in Norway. During the initiating application of the current, the gases in the coal are distilled off to provide a high calorific-value effluent, and leave behind a compact but permeable block of carbon through which air can be forced to give a carbon monoxide-bearing gas. Less mining work and greater flexibility are attractive features of this new technique, though its economics are still uncertain.

ORGANISER WANTED

IN these notes last week the exhibition organised by the Central Regional Council of the A.S.E.E. was recommended as worthy of success; it is pleasant to be able to record that it achieved this unequivocally. In a large part, this is a personal triumph for Mr. P. A. THOROGOOD, who undertook in his own time almost all the detailed organisation of the exhibition, from the initial planning stage to the culmination of the venture in a steady stream of visitors, who braved the bitter weather of last weekend. Moreover, the welcome given to the exhibition has a wider significance. It highlights the need for an exclusively electrical exhibition. Many of those who came to the New Horticultural Hall commented most warmly on the special atmosphere discernible on all stands, with the accent on making technical information available on the spot. There is little doubt that a similar exhibition will be demanded for next year. Where it will be staged, and who will organise it is less apparent, for the demand for space is sure to be intensified beyond the capacity of this year's venue, while Mr. Thorogood and his helpers can hardly be expected once more to bear the burden of the office side.

TALKING CONTACTS

CONTACTS are present in all electrical machines and apparatus; few components familiar to the electrical engineer can claim such ubiquity. So there can be no lack of material for a Convention on Contacts which has been organised as a local venture by the East Midlands Centre of the I.E.E., with its opening arranged for Loughborough College on Monday next. The subjects selected promise a most useful summary of the present state of knowledge concerning both light and heavy duty contacts, but beyond this, the list of lectures adds hope of a fruitful interchange of ideas between those working in the operational, design and research fields. It is perhaps an admissible criticism of the attractive programme which has been drawn up that it allows too little time for the formal discussion of its many riches; though this may be to some extent offset by the informal opportunities that the residential nature of the Convention provides, the balance still seems likely to result in some mental indigestion. But these are details, if important ones. The Convention should achieve a marked success, and encourage to useful emulation some more of the Institution's lively local centres.

Meteor

OPERATORS and Machine Efficiency

FIRST OF A SERIES OF ARTICLES WHICH WILL STUDY THE APPLICATION OF PSYCHOLOGY TO ENGINEERING DESIGN

By BERNARD GIBBS*

THERE is rapid and continuous progress in technical efficiency, and many manually operated processes can now be found where the chief remaining source of errors or inefficiency lies in the limitations and shortcomings of the human operator. Even more numerous are those man/machine systems where considerable improvements can be made in overall efficiency at the cost of very little time and effort, by analysing and improving the working conditions of the human operator. There are anatomical, physiological and psychological factors to be taken into account when machines and processes are designed for human control, and when the illumination, temperature and noise levels of the working environment are considered. These factors may affect overall efficiency as much, or more, than the purely technical aspects of design, although they are rarely given equal attention.

Engineering Psychology

This field of study has been called "engineering psychology," and some of its problems are to specify the types of instruments and machine indicators which can be most easily observed and understood, and the best type and placement of the controls that are manipulated by the human operator. His comfort, safety, optimal working load, and tendencies towards fatigue and boredom often need specialised study; the nature and interaction of the signals that the sense organs receive from the machine may determine the proportion of the population who are capable of reaching an acceptable level of skill, the training they will need, and the level of efficiency that will be reached after full training.

It is obvious that many sciences must contribute to the understanding of these problems and their solution. Mathematicians, biologists, physicists, and engineers all play their part, but experimental psychologists have made many contributions to this subject, and their methods and findings will be considered in the main in this article. Their methods are those of empirical science, and factual observations are the basis of their findings, although the raw material of "measured human performance" is much more variable and complex than that of the physicist, chemist or engineer. The psychologist must therefore use refinements of the statistical techniques to a much greater extent than other scientists before he can be sure that his results are reliable and not due to chance day to day variations in the performance of his subjects, or to other uncontrolled variables in the experiment.

It is by no means a new idea to vary external conditions, and to measure the corresponding changes in human performance, which then define the optimal conditions. Burnham, in 1892, found that printed characters should be at least 1·5 mm high at the average reading distance of 14 in., and more recent tests have confirmed that a quite minor increase or decrease in this size results in an appreciable retardation of reading speed. But applications of the methods to machine design were sparse and slow, although it would follow immediately from Burnham's results that there is, for example, an optimal size for instrument figures; and, indeed, for the size of the instrument dials, when a number of instruments are simultaneously displayed at a panel or array, and viewed from a relatively constant distance.

Examples Needed

It is only in recent years that specialised attention has been given to such problems of machine design, and then to the design of fighting machines and devices under the stress of war conditions, when it was clear that an operator's errors or learning difficulties might well decide his survival. Much information relevant to industrial design has meanwhile become available. The immediate need is not to publicise such data, however, although this is important, but rather to prove by concrete examples that the best conditions for the human operator cannot usually be found by

* *Mr. Gibbs is working with the Applied Psychology Research Unit of the Medical Research Unit at the Psychological Laboratory, Cambridge.*

"experienced opinion," there are few cases where established practice cannot be improved.

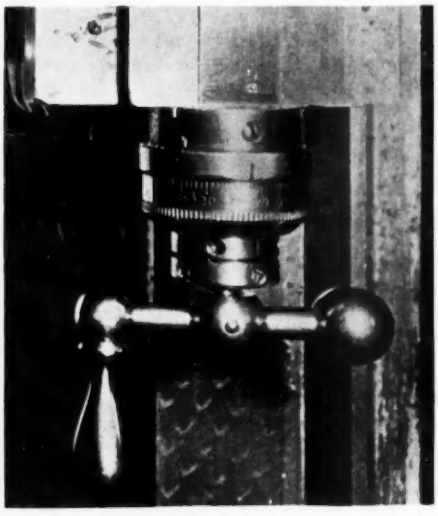
The limitations and capacities of the human operator must be measured accurately by the engineering psychologist, and the engineer must then design machines so that the working conditions of the operator lie within human tolerance limits. This sort of requirement is accepted without question in the case of electric motors and other physical elements in the chain of control; but it is still relatively new in regard to the human operator, although he is often the most important single element, and machines are only the mechanical extensions of man. In this sphere, as in all others, common sense and those methods of design described as "experienced opinion" or "rule of thumb" have their limitations, and are not always a satisfactory substitute for careful measurement and specialised knowledge, particularly when a considerable change from established practice is under consideration.

Current Experiments

The alternative method of task analysis and controlled measurement is illustrated by some current experiments on the design of machine tool indicators. They demonstrate the substantial improvements which can be made in indicator design at reasonable cost, and the underlying principles have a direct bearing on the design of a large range of instruments.

The example was selected because it clearly shows the basic method and all engineers will have seen or used the indicator. It has been developed from the first concept to a sound commercial product of considerable potential importance to the major industries. Similar work is in hand on electrical indicators, but has not yet reached the same stage.

Fig. 1. The traditional type of machine tool indicator imposes unnecessary strain on the operator



The traditional type of machine tool indicator is shown in Fig. 1. A rotating micrometer dial is generally used, sub-divided by graduations which usually indicate 0·001 in. linear travel, but with a range of only 0·25 in. of direct reading, i.e. a complete revolution of the dial equals 0·25 in. linear movement, and beyond this the dial readings return to zero, with nothing to indicate the number of complete revolutions or to convert them into linear measure. The range of movement of a machine tool may be several feet, however, and it follows that when large adjustments have to be made the operator must count the complete revolutions, read off the number corresponding to any fraction of a turn, and calculate from this the total linear movement. Large and accurate adjustments between fixed settings are often required, of course, and the poor design of the indicator imposes additional and unnecessary operational processes which are notoriously susceptible to error and delay. (External measuring devices and jigs are often used in practice to eliminate these processes, or workpieces may be "marked off" before machining begins; but these methods again form a source of errors, delay and expense.)

It is evident from this task analysis that the ideal indicator for machine tools must give a direct reading over the whole range of movement, while showing clear sub-divisions of 0·001 in. of travel. The combined characteristics of a tape measure and a micrometer are required. A cyclometer form of counter appeared to offer a promising solution, and a four-figure counter with manual setting to zero was geared to the traverse shaft of a horizontal borer. The gearing used was such that the units of movement appeared in decimal order at their respective windows, i.e. inches of travel at the first window, followed by tenths at the next, and so on down to thousandths of an inch at the last window. A direct reading of total movement, relative to a fixed datum, was thereby obtained.

Results

A number of operators were then given the task of boring ten holes at varying distances from a fixed datum, using the dial and counter method in alternate order. The boring, setting and calculating times were recorded, and

errors were measured on completion of the task. The average time to bore the holes was much less when the counter was used (3 min 42 sec as compared with 6 min 3 sec) and the setting errors were far fewer and smaller with this method of indication (one small error with the counter as compared with 18 large initial errors with the dial, plus a

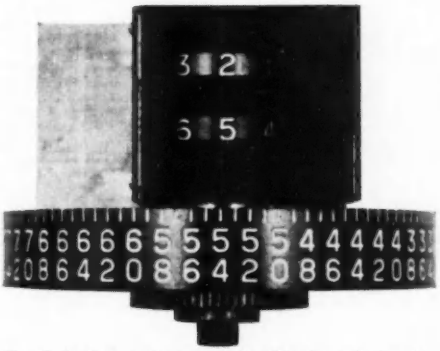


Fig. 2. Redesigned as a result of task analysis, the indicator combines new ideas with the better features of the old system

further 15 errors which were caused by the initial error being repeated in subsequent settings).

These results were promising, although a more detailed analysis of the task showed that the dial method had some possible points of advantage in spite of its great overall inferiority. A completely new type of indicator was therefore designed (Fig. 2) which retained and combined the advantages of both counter and dial. The counter method had the disadvantage that high setting speeds were not possible, because some counter wheels then rotated too rapidly to be deciphered, and this tended to slow down the rate of work. There was also some initial uncertainty concerning the relationship of rotational to transverse motion using the ordinary counter. It can be seen, however, that the new indicator eliminates these defects.

Readings are made vertically, in the illustrated version of the indicator—the upper figure showing inches of movement, the next tenths, and so on to the lower reading of thousandths. The device was fitted to the cross feed shaft of a lathe, and a tool stop was provided at a known distance from the centre so that the tool could be set to this datum, and the indicator to the known reading. Alternatively, an external micrometer could be used for first setting up.

The gearing was designed so that the tool would cut material to the diameter shown by the indicator throughout the entire range of machine movement, after the initial setting up. It was hoped that this method would reduce calculating time and the time required at present to stop the machine and to use external micrometers, etc., since the new indicator was designed to give the effect of a reasonably cheap and accurate "built-in micrometer" with a large range of direct reading.

Training Time

This proved to be the case. Turning experiments were set up, designed mainly to discover any defects in the new indicator by using the most adverse test conditions. In spite of this adverse bias, and the greater familiarity of skilled turners with the old methods, the test showed time gains of between 20% and 55% using the new method, and equal accuracy in turning four small shoulders on a brass bar. The training time of unskilled subjects was considerably reduced, since, after a brief demonstration, youths from a technical school could keep pace in plain turning with their skilled handicrafts instructor when they had the advantage of the new indicator. Their times were much longer, however, in a ratio of approximately 3·5 to 1 when they used the old method. Accuracy was slightly better on average with the new indicator during these tests. It may appear, therefore, that the new indicator has considerable commercial possibilities far outweighing the time spent in analysis and test. It will not be expensive and has been developed much further than the illustrated version to give high accuracy and long life, and to permit easy setting up and retrospective fitting to existing machines.

There are a great many machine tools in industry and the capital value of the goods produced is very high. A saving of even one hour per week by the general use of the device would have a very considerable economic effect in aggregate, compared with which the cost of the indicators and their fitting would be negligible.

The general characteristics of the indicator may make it suitable for many purposes when large physical quantities have to be measured with great precision. It has the counter's advantages of great range, fine sub-division and direct reading, together with the dial's advantages allowing the rate and direction of change of measured quantities to be directly observed. It is perhaps the nearest approach to the "universal" quantitive indicator so far developed.

These characteristics are required in altimeters, for the linear measurement of yarn, and the thickness of rolled metal, to mention only a few possible applications.

The same sort of improvements can be shown when control levers are scientifically designed to increase the accuracy of the operator's movements. Careful attention to more complex variables in machine design can greatly decrease learning time, increase the number of those who can learn, and improve their efficiency. In some cases psychological advice can be given immediately, on the basis of existing knowledge, whereas in others experiments are required which may range between a few days and several years—depending on the problem. The shortage of personnel trained in this work means that only a few of the most pressing problems can be tackled in the present laboratories, and there would be a considerable gain in industrial efficiency and economy if engineers learned and applied more widely on their own account the principles and methods of engineering psychology.

ACKNOWLEDGMENTS

Many firms and establishments gave encouragement and advice during the development of the measuring device. I am grateful for the testing facilities kindly made available at the College of Aeronautics and the Production Engineering Research Association. The specialised design and manufacturing facilities of Messrs. English Numbering Machines, Ltd., made possible the successful development of the commercial product which this company will be marketing in due course.

Electronic Control at a Refinery

Remote Process Operation at Llandarcy

THE new sulphur dioxide extraction plant commissioned late in 1951 by National Oil Refineries Ltd., Llandarcy, South Wales, to produce premium grade kerosene, is believed to be the first refinery plant in the world to be completely controlled electronically. This plant, which has been in successful operation for some months, is part of the Anglo-Iranian Oil Company's large development programme in the United Kingdom, and marks a considerable technical advance in instrumentation and process control.

Operating Principle

Electronic measuring and control instruments which are used exclusively in the plant for flow, pressure and level, operate on the Evershed Electronic Repeater System and have been manufactured by Evershed and Vignoles, Ltd. The advantage of electronic, as opposed to pneumatic, operation lies in the fact that the response is virtually instantaneous irrespective of the distance between the plant and the control room. Time lags due to the compressibility of air in the transmission lines—an inherent factor in any pneumatic control system—are therefore eliminated, and any deviation from the required quantities of flow, pressure or level is detected and corrected instantaneously.

The main development is the Evershed Process Controller, a three-term instrument having directly calibrated adjustments for proportional band, integral and derivative times. The controller has an output of a few milliamperes d.c. and is used to position standard diaphragm type control valves, using air pressure as the motive power. Connection between the plant and control room is by multi-core telephone cable, the electric signals between the various instruments being in the form of a small continuous direct current.

The equipment is certified as intrinsically safe, and flame-proof practice is required only on certain apparatus in the control room which is connected directly to the mains supply. The apparatus is independent within wide limits of variations in supply voltage and frequency.

The Llandarcy plant was designed for an output of 330 tons per day, but is now operating at 500 tons daily. The instrumentation comprises 24 Evershed Process Controllers, seventeen being concerned with liquid levels, four with flow and three with pressure. In addition, various other quantities are indicated and recorded, and an alarm system is provided. The control-room panel comprises 26 sections, each 2 ft wide and 6 ft high.

British Construction

The instrumentation is unique in that it is entirely British in conception, design and manufacture in a field previously the prerogative of American industry. It is the outcome of a large development plan instituted by Evershed and Vignoles Ltd., some four years ago, to extend remote control equipment into the process control field. The principles employed are those which have been successfully utilised in water, electricity and gas undertakings where transmission distances over many miles are common. Specially rugged construction in non-corrosive materials has, of course, been necessary to meet conditions encountered in the oil industry.

Our readers' views . . .

Wiring Direct in Concrete

BEFORE you decide to "close" the correspondence on the subject of "Wiring Direct in Concrete" may I say to your many correspondents that this system was successfully used in the electrical installation of about ten blocks of luxury flats and one large hotel in London twenty years ago.

The T.R.S. was laid direct on the shuttering, and followed a set pattern, on each floor. The cable was never run to the points direct, but followed a course of right angles and before the concrete was poured on, a boy would mark the shuttering with whitewash along the cable runs, so that when the shuttering was removed, the runs of cable could be followed, by the whitewash on the concrete.

Where possible, wooden blocks were inserted in the position where the ceiling point would be, and before plastering, this was cut out, and a four-way cast-iron junction box was fixed in its place, by suitable fixings, and the cables were taken into the box. The whole was then cemented in.

Three-core T.R.S. was used, and also the ring main system. Of course this method used plenty of cable, but it paid dividends when perhaps a large flat was converted into two smaller flats or when one core went faulty.

The wiring is not exposed, hence lack of deterioration, and I gather that the wiring on these installations is still as good as new.

HILLINGDON. *"T.R.S."*

◆ ◆ ◆

Blasting for Line Erection

HAVING had experience of the type of accident mentioned by Mr. Morrish in which the operator when using a powder fuse was injured in a scramble to get away over a boulder-strewn surface, I think the matter should not rest without a brief reference to electrical detonation. This method enables the operator to work calmly and in safety, the shot being fired either from the sparking plug of an I.C. engine or a hand-worked exploder some distance away. Moreover, where the danger zone includes part of a highway or rail-track, it is necessary to put the minimum restrictions on traffic, and this may be done through the simultaneous electrical detonation of a number of charges.

An important point that cannot be overemphasised is that following a misfire and subsequent explosion of a second charge adjacent to the original, it is important to examine the site with great care in order to discover possible unexploded charges or detonators.

As a matter of interest, in North America blast excavation is not confined to rock. In soft soils where there exists surface water, a shallow hole may be scooped out and in it placed the butt of the pole which is supported vertically by guy ropes. A 1½-in. dia. hollow steel pipe is driven into the ground below the pole, soil which has entered the pipe is forced out by ram, an explosive charge is inserted and the pipe pulled up leaving the charge in position. Following electrical detonation, the explosion causes cavitation below the pole through upward surge of gas, soil and water, and the pole settles down in the cavity. Some control over the depth of planting is obtained by rocking the pole to and fro as the charge is fired. A variation of this method is to suspend the pole clear of the ground from a jib on a tractor or crawler, exercising planting control by altering the length of drop. A rapid release winch is required to permit dropping of the pole just after the explosion occurs.

HAVANT. *G. R. Lomax* A.M.I.E.E.

◆ ◆ ◆

Wagons on Tipplers

WHILST agreeing with E. R. B. Roberts (your issue, March 13) that self-discharging railway wagons would dispense with the need for "Heath Robinsonian" tipplers, may I point out that he is indulging in day dreams.

Has he, for instance, considered the cost entailed in converting thousands of wagons to the type he suggests, or the expenditure involved in altering already sound coaling arrangements at most of our large power stations? I doubt it.

These tipplers, if well maintained and intelligently used, are efficient, reliable and constitute one of the smallest worries of operation engineers.

Your correspondent makes a common error in spending his time suggesting Utopian ideas rather than overcoming present-day difficulties.

LIVERPOOL 7 *J. D. Harrison*

Electric heating for COAL GASIFICATION

NEW TECHNIQUE OF USING COAL UNDERGROUND

UNDERGROUND gasification is an economic proposition, according to members of an International Conference on Underground Gasification of Coal, which met in Alabama, U.S.A., in February. One of the production techniques they considered uses electricity as a means of firing the coal, and some details of this system have now become available.

Two holes, bored from the surface to a coal bed, are linked by an electric current, which raises the temperature of the coal to a point at which combustion takes place, and gasification with air is possible. In tests at the Gorgas project, the continued application of an electric current raised the temperature of the coal to a point at which distillation products began to appear. Over a period of time it appears that a path of high temperature carbonaceous matter is formed which is permeable to air and suitable for subsequent gas making.

Costs are claimed to be less than one dollar/ton of coal burned in a report which appears in *Electrical World.*

Experimental Conditions

For the purpose of the tests a seam of coal having a cover of fire clay and sandstone was selected, as it was thought that gas seepage would thus be kept down. Four 10 in. boreholes were drilled, arranged in a straight line on 67 ft centres, 6 in. pipes were lowered nearly to the coal seam, and the annulus remaining used to house a water pipe and thermocouple leads, afterwards being grouted solid.

A 4 in. dia. stainless steel rod was chosen as an electrode, and this was lowered 17 in. into a hole drilled into the coal bed. A copper cable of about 1 in. diameter connected the electrode to the surface, where a 500 kVA auto-transformer provides the necessary supply.

Potentials of 1,800 V and 1960 V were applied between separated electrodes in two pairs of boreholes, and the resistance measured between the 67 ft-separated electrodes fell in one case from 15·3 ohm to 2·7 ohm in 17½ hours, and in the other from 34·7 ohm to 6·5 ohm in 10¾ hours. In all cases, the current was in the range 100 and 500 amp, the higher values being reached in the first case. At the end of the periods noted, arcing commenced between the electrode stems and the borehole casings, and this reduced the effectiveness of the current.

In spite of this, the current flow was maintained for two weeks. In the initial stages noted above, 7,500 kW/hr were used for the first two boreholes, and 5,000 kW/hr for the second. During and following the electrification procedure, air up to 100 lb/sq in. was injected at the boreholes to start gasifying the coke being formed.

ELECTRICAL CHARACTERISTICS OF CIRCUITS BETWEEN TWO BOREHOLES

Time from starting Hours	Potential Volts	Current Amps	Resistance Ohms
¼	1,960	70	34·7
½	1,960	90	22·3
1¼	1,960	101	18·6
3¼	2,500	155	16·7
4¼	2,500	190	13·0
5¼	2,500	215	11·7
6¼	2,500	248	9·8
8¼	2,480	263	9·2
9¼	2,480	292	8·1
10¾	1,820	275	6·5

During a 44-day test period, various arrangements of air injection were tried, with inputs from 95 to 365 cu ft/min, and pressures of 32 to 100 lb/sq in. Gases obtained had an average calorific value of 186 B.Th.U./cu ft, with a variation between 80 and 300 B.Th.U./ cu ft.

The higher calorific values were attributed to methane from the products of coal distillation, but during one period considerable proportions of carbon monoxide were obtained, indicating that gasification was taking place.

Conclusions

It was decided on the basis of the test results that leaks of air in ground strata can be eliminated if the seams fired lie at a great enough depth, and that a greater volume of air forced into the burning coal will yield a higher temperature and richer gas. It was also considered as proved, that shale rock will fuse and maintain sufficient strength to hold up the overburden and prevent caving-in of rock above the seam being fired.

The electro-linking method is thought to have advantages over previous methods tried, particularly in enforcing contact between the gas-making fluids and the coal face. As the burning seam recedes, electrodes can be relatively readily moved to new bore-holes.

MEASUREMENT *and Research*

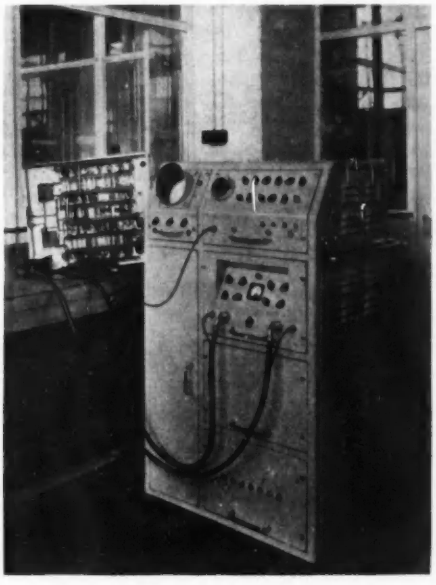
Electrical and Electronic instruments again predominate at the 36th Annual Exhibition of The Physical Society

THE exhibition of scientific instruments and apparatus held by the Physical Society each year is rightly regarded as an opportunity of displaying the high quality of craftsmanship and the ingenuity in design of British instrument makers. As usual, the exhibition will be held at the Imperial College, South Kensington, from Thursday, April 3 to Tuesday, April 8, and admission is by ticket only. While this restriction of admittance serves to reduce the numbers present—and from past experience even this does not preclude a congestion, making the viewing of exhibits a physical feat—it seems a pity that a larger exhibition space could not be chosen and the exhibition thrown open to the public for a day or two. Some alleviation, however, may be expected this year by the use of the Huxley building in Exhibition Road in addition to the main building in Imperial Institute Road.

The main portion of the exhibition is, of course, devoted to the measurement of physical quantities and the investigation into the properties of materials, and as is to be expected, electrical and electronic equipment is predominant. Some firms, and most of the Ministry of Supply establishments, are showing special apparatus designed for use in some particular research line, but on the whole individual instruments are in the great majority.

Multi-Range Meters

As a laboratory tool, where high accuracy is not required, such as in checking voltages and circuits, the multi-range meter is becoming increasingly popular. Apart from the convenience of having many ranges of current voltage and resistance available in the one instrument, the robustness of these instruments with their built-in protection well suits them for routine testing. Probably the best known instruments in this category are the "Avo" series made by the Automatic Coil Winder and Electrical Equipment Co. Latest in the range is the Model 8 AvoMeter which has the high sensitivity of 20,000 ohms/volt on the d.c. voltage ranges, and 1,000 ohms/volt on the a.c. higher ranges. A welcome accessory is a p.f. and wattage unit, which can be used with a standard AvoMeter to measure p.f. and watts in single-, two- and three-phase circuits. This will shortly be in production. A blind man's version of the Model 7 has also been produced. Multi-range test sets are also being shown by British Physical Laboratories, who have a 20,000 ohms/volt universal instrument, and by the Electrical Instrument Co., who are exhibiting four standard units. From Sangamo Weston comes the Model S.75 test set with 53 ranges, sensitivity 20,000 ohms/volt on d.c. ranges and 1,000 ohms/volt on a.c., and a lower sensitivity unit, the S.112. Both these are of "first grade" accuracy. Nalder Brothers and Thompson have a multi-instrument test kit comprising ammeters, voltmeters and wattmeters, all contained in a lightweight portable case, and Zenith are including multi-range instruments in their selection.



Metropolitan Vickers high speed recurrent waveform monitor complete with test probe

G.E.C. split tube graphite heating element for high temperature vacuum furnace

Single-Purpose Meters

The design of single-purpose meters such as wattmeters, ammeters and voltmeters for commercial use is now well established, and no radical design improvements are to be seen. Most of the firms mentioned above are showing these instruments. Of interest to aircraft electrical engineers, however, is the Weston Sangamo circular scale instrument, and in the same field are the Salford Electrical Instruments' range of 2 in. moving coil instruments with 270° scales. Measuring Instruments (Pullin) Ltd. have some miniature 1½ in. dia. moving coil instruments for use in restricted spaces, and British Physical Laboratories a selection of moving coil and moving iron types. An interesting projection-type meter for lecture theatres and demonstration purposes is also being shown by this firm.

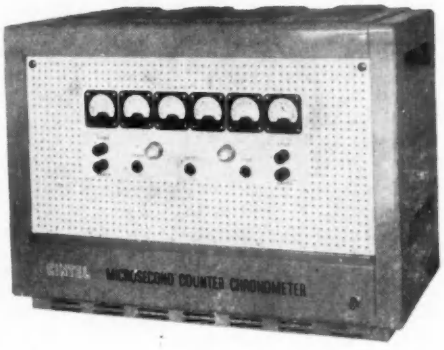
Switchboard instruments are being exhibited by Sifam Electrical Instrument Co., the Electrical Instrument Co. and Nalder Bros. and Thompson.

Laboratory Instruments

When it comes to laboratory work, the measurement of electrical quantities is usually referred to standards of resistance or to absolute measurements involving mass, length and time. Resistance measurements generally involve the use of bridges, and several firms are exhibiting in this field. H. Tinsley and Co. have a new general-purpose impedance bridge for the measurement of "L," "C," "R," dissipation factor and "Q" with moderate definition—well within ±1%. In the "R" and "C" field is a bridge by Cinema Television Ltd. which has a range of 0·3 pF to 100 μF full scale. Resistances cover from 1 ohm to infinity, the last calibrated reading being 10,000 MΩ. In this case, however, the operating frequency of the bridge is 1,592 c/s, and balance is indicated by a valve voltmeter of logarithmic sensitivity.

Using mains frequency is a universal bridge by Avo's, having in all 20 calibrated ranges for the measurement of resistance, capacitance and inductance. The value of the unknown impedance, in this case, is directly indicated on a single scale, together with the appropriate multiplier. H. W. Sullivan have a direct reading universal precision inductance bridge 1 μH to 100 H with an accuracy within 0·1%; a capacitance bridge 0·1 pF to 1 μF, accuracy to 0·01% (on higher values); and a universal a.c.-d.c. bridge giving resistance, inductance, capacitance and conductance to within 1%.

Cintel microsecond counter chronometer



To the heavy power engineer, the measurement of low resistances is of great importance, and pre-eminent in this field is the Kelvin bridge. A version by W. G Pye of the double Kelvin bridge covers resistances over the range 0·1 microhm to 10 ohms.

Schering bridges are being shown by Gambrell Bros. and Co. and British Physical Laboratories.

All of the bridges mentioned above have built-in galvanometers, but in many laboratories straight bridges requiring external indication of null-points are still in use. Galvanometers for this purpose are being shown by Sunvic Controls, who have an industrial type with a sensitivity near balance, of 15 μA/μV, input impedance 10 kΩ, and zero stability of 1 μV. H. Tinsley have a shock-

proof galvanometer in which the suspension is immersed in a liquid whose density is such that the weight of the suspension unit is equal to its displacement. Sullivan are showing both "fixed" and portable galvanometers, while W. G. Pye have several galvanometers including a "demonstration" model for use in lecture theatres.

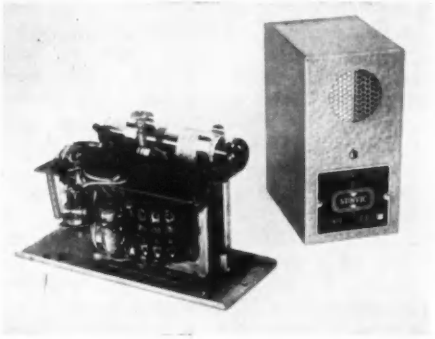
Heating Investigations

The electric furnace is a most important equipment, particularly in metallurgical research. A standard range of rectangular chamber types, varying in size from 6 in. by 6 in. by 2 in. up to 72 in. by 24 in. by 20 in., is being shown by A.E.W., Ltd. The temperature range of these furnaces is 0-1,200° C. For laboratory work is a tube muffle furnace with a maximum of 1,000°C, and the same firm is also showing laboratory ovens (0-350°C) and a crucible furnace (0-1,100°C).

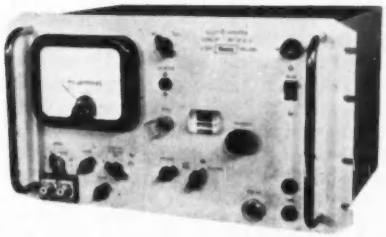
More specialised in its application is the G.E.C. high temperature, high vacuum furnace. It employs a graphite element and holds a cylindrical charge of approximately 6 cm. long by 6 cm. dia. A temperature of 2,000°C can be reached in a few minutes, and when this temperature has been obtained the input is only a few kW.

Temperature measurement is represented by the B.T.H. pyrometer instruments using lead sulphide cells. The range covered is 150°-500°C with an accuracy of ±5°C. The "Thermaster" by Sifam Electrical Instrument Co. is a portable low temperature indicator which can be calibrated to give any range between −80°C and +200°C. Portable pyrometers and switchboard type pyrometers up to 1,000°C are also available from this firm. Sunvic Controls, Ltd., have a radiation pyrometer using photo-electric methods which can measure temperatures of 900°C and upwards.

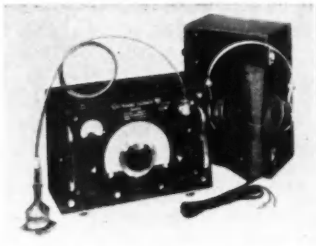
A comprehensive display of temperature measuring equipment is being shown by the Cambridge Instrument Co., who have this year concentrated exclusively on this subject. A special Féry radiation pyrometer can be used for temperatures up to 2,000°C. The same type of instrument has been modified for use as a "flying" pyrometer for measuring the temperature of metal billets entering rolling mills. Both thermo-electric and resistance thermometers are shown for use with sub-normal temperatures.



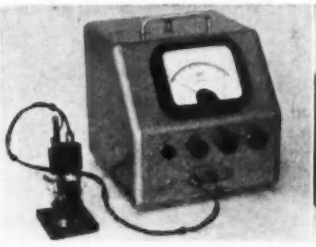
Sunvic electronic relay equipment removed from case



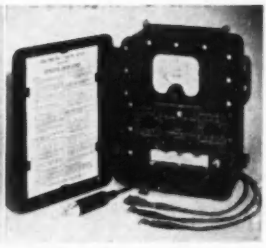
Plessey selective amplifier Type E.117



Dawe ultrasonic thickness gauge showing test head and receiver



Pye direct reading Ph meter for acid/alkaline measurement



Service version of the "Micovac" valve voltmeter

Resistance Measurements

Laboratory resistance measurements are usually carried out by comparing known values to the unknown quantity by means of bridge circuits. The bridges themselves have already been mentioned. Unit resistance boxes are, however, being shown by W. & J. George and Becker, Ltd., who have a series of units of identical size, 4 in. by 4 in. by 3½ in. which may be hooked up to form any given network. Decade resistance boxes from 0-0·9 ohm up to 0-9,000 ohms adjusted to 0·25%; ratio arms, potentiometers, switch boxes and a centre zero galvanometer are also available in this series. Precision decade resistance standards and bridges are also available from H. W. Sullivan. All these are for laboratory use. The same firm is showing a precision Wheatstone bridge reading direct in both "Absolute" and "International" units.

For the commercial field, many of the multirange instruments have resistance scales for direct reading, but in the very high resistance field, the "Megger" testers remain preeminent. Evershed and Vignoles have now extended their instrument range by the introduction of a special high-voltage, mains-operated "Megger" insulation tester. This is a 5,000 V tester which uses a static rectifier in conjunction with a step-up transformer to obtain its output. Three testing voltages are available: 1,000, 2,500, and 5,000 volts. The familiar double scale is used, reading on the 5,000-volt range 0 to 500 megohms and 30 to 100,000 megohms. The effect of variation in supply voltage has been almost completely eliminated.

A direct reading milliohmmeter, an ohmmeter and a megohmmeter are being shown by Electronic Instruments, Ltd. The range of the latter is 0·3 megohms up to 2×10^7 megohms in seven decades, and two test voltages of 85 and 500 volts are provided.

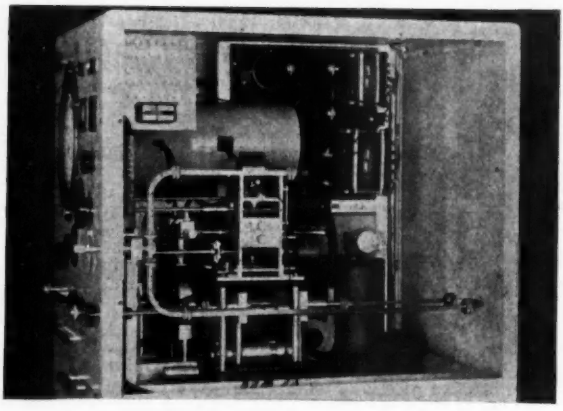
Controllers and Recorders

With the rapidly increasing use of instrumentation and centralised control, together with automatic process control, it is only to be expected that this field should be well represented. A furnace controller with a sensitivity of 2°C between 0 and 1,000°C is being shown by Nash and Thompson. Sunvic Controls have a resistance thermometer controller for use with a platinum resistance thermometer. The temperature range is 300 to 1,100°C, and an electronic system is used. The well-known mercury-in-steel principle is used in a temperature controller by British Rototherm; temperature range is −30°F to +1,100°F with a minimum coverage of 50°F. From the British Thermostat Co. is the Series ZA Electric Proportioning Equipment which provides remote control of power units and valves in response to changes in temperature pressure, humidity or liquid level. It is designed for industrial processes, heating, refrigeration, and air-conditioning applications.

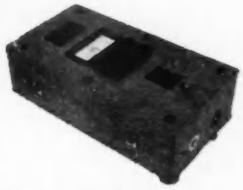
A high-speed recorder by Ferranti uses a recorder head with 32 fixed styli. The range of variation of the input quantity is subdivided into a number of intervals corresponding to the number of styli, and only that stylus is energised which corresponds to the instantaneous value of the input quantity. The energised stylus makes a mark upon voltage sensitive paper. This enables very high speed recording to be attained without the use of inks.

The resulting trace of lines and dots, is easily read, and the usual difficulties inherent in pen type recorders are avoided. Input frequencies of above 2,000 c/s can be recorded without distortion. Paper speeds are 1, 3 and 10ft. per second.

Ediswan have a pen-oscillograph equipment capable of taking 1 to 4 pens simultaneously, and Evershed and Vignoles have a recorder with a maximum sensitivity of ±1 millivolt and designed to follow frequencies up to 10 c/s. The Pye four-channel amplifier is used with the Kelvin and Hughes Mk. IV Four-Pen Recorder and is particularly suitable for geophysical prospecting.



Side view of Elliott Bros. microwave impedance meter



H.V. mains operated Megger insulation tester

E. K. Cole scintillator counter N509

Weston Master II exposure meter

Siemens compact arc discharge source of u.v.

Left: Avo valve characteristic meter

Right: G.E.C. portable fluxmeter

Signal Generators

The signal generator has now become an indispensable instrument not only in the wireless and radio field, but also in the realm of telecommunications and radar. Of particular interest are the square wave and pulse generators, as by these instruments the response of networks and circuits can be tested and checked. Elliott Bros., for example, have a generator producing periodic short pulses of h.f. energy of rectangular envelope shape. The pulse length can be varied between 0·1 and 0·5 μsec. and the frequency goes up to 60 Mc/s. This is primarily designed for testing broad-band networks. A square wave generator by Allied Electronics covers the range 5 c/s to 100 kc/s in nine ranges, and has a rise time of the order of 0·05 μsec.

A complex crystal controlled pulse generator, built for testing sealing units, ratemeters, and so on, has been built for the Ministry of Supply Establishment at Harwell by Nucleonic and Radiological Developments Ltd., This gives outputs of 100 kc/s, 10 kc/s, 1 kc, 100 c/s, 10 c/s, 1 c and 0·5 c and these in turn can be subdivided by a selector switch into halves or quarters. The output is variable up to 50 V and can be controlled to supply either a continuous series of positive pulses of 2 μsec. duration, or chains of pulses (at the selected frequency) every two seconds.

Standard Telephones and Cables have a microwave signal generator, covering the range 3,500 Mc/s to 4,400 Mc/s. This delivers up to 1 mW into the external circuit from the matched output impedance.

More popular in application are Philips Electrical's television standard signal generator which can be used for stage checking of T.V. receivers and the small pattern generator for testing completed receivers. In the radio field Philips have the G.M. 2653 high-precision generator with frequency ranges of 32 kc/s-32 Mc/s, 100-500 kc/s and 400-500 kc/s. An internal modulation of 400 c/s is provided, and the instrument can accept external modulation 32-12,000 c/s. The accuracy is to within 0·1%.

Avo's are showing a wide-range generator of a commercial pattern covering 50 kc/s to 80 Mc/s and an accuracy of 1%, and British Physical Laboratories have a high-frequency signal generator covering 100 kc/s to 80 Mc/s.

In the very high-frequency range is a generator type CT 53 by the Wayne Kerr Laboratories Ltd., which covers 9-300 Mc/s. This is suitable for internal modulation by sine or square wave at 1,000 c/s or from an external source either with sine waves in the range

10 c/s to 10 kc/s or if required can accept with short duration pulses of 1·5μ secs.

Thickness Measurement

The measurement of thickness is one that can be performed in a variety of derived ways when free access to both sides of the material under consideration is impossible or when the material itself is in rapid motion. Nash and Thompson, for example utilise the variation of inductance in a pick up head to measure the thickness of paint on metallic sheets. Dawe Instruments use an ultrasonic method which can cover thicknesses of 1/16 in. to 12 in. for steel. Radioactivity has been selected by E. K. Cole, whose meter covers paper 0·001 in. thick to steel 1/32 in. thick. This instrument gives readings of percentage deviation from standard. Radio activity is also used by the Baldwin Instrument Co., who have the Atomat, Beta-Ray thickness or weight gauge, the Beta-Ray Backscatter thickness gauge, and for heavy metals, the Gamma-Ray thickness gauge. This last has a gap between source and detector large enough for hot mill rolling mill use. The instrument is also sufficiently rugged to stand up to the vibration of this work.

Materials

Rare and precious metals and the name of Johnson Matthey are closely associated in the scientific world. This year the firm is showing several of the special alloys developed for use in the electrical field. Rhodium-platinum thermocouples are of particular use in high temperature measurement and special resistance wires of diameters down to 0·0005 in. are required for numerous purposes. For contact purposes are headed, turned and composite contacts in silver, platinum, palladium and other alloys. These are used where contact resistances must be kept to minimum values. Where, however, contact pressures are light, and freedom from noise, oxidation and tarnishing are needed, such as is required in telecommunications work, electrodeposited rhodium finishes have been found most satisfactory.

Special metals are also being shown by Murex Ltd., who can now provide sheets of zirconium metal up to 20 in. wide by 3 ft. long. It has been found practicable to weld these sheets. Thin walled tubes are also being drawn from the metal, which possesses strong resistance to attack by acids or alkalis. Other metals in which forming techniques are being developed are tantalum, molybdenum and tungsten. The firm is also showing sintered composite magnets into which soft iron and stainless steel parts have been sintered.

Sifam "Thermaster" low temperature indicator

Telegraph Construction and Maintenance have been investigating the production of non-ferrous alloys to reduce usage of rare metals. One of these is Telconal a copper-manganese-aluminium alloy which can substitute for the generally used nickel-copper (Constantan) alloy. A combined material is aluminium clad iron, which combines the surface properties of aluminium with the strength of iron. Samples of magnetic alloys—H.C.R. Alloy, Radiometal, Mumetal and hard magnetic alloys—are also being shown.

Micropowder magnets using extremely fine particles of pure iron, and low loss powder cores are shown by Salford Electrical Instruments.

Atomic Research

In the nuclear physics and atomic research field, many firms are participating in the manufacture of special intruments. Panax Equipment Ltd., are showing Geiger-Müller counting equipment, ratemeters and dosimeters; Dynatron's have a scaler with a special probe unit to avoid spurious counts; 20th Century Electronics make a feature of Geiger-Müller Counter Tubes; E. K. Cole, have scintillation counters, a portable radioactive ore detector and a portable dose-ratemeter; Cintel are exhibiting the C.K. dosimeter and charging unit; the Baldwin Instrument Co., also specialise in ionisation meters, electrometers, and gamma-radiation meters; Mullards produce a range of radiation counter tubes; Labgear have built a Dekatron register unit and a laboratory ratemeter; practically all the equipment produced by Nucleonic and Radiological Developments is in this field, and Hivolt, Ltd., are showing stabilised power packs for G-M tubes.

Components

Although the finished instruments are of considerable interest, it would be unwise to overlook some of the new components which have been developed. Resistors play an important part in almost every instrument and are needed for the precise control of current. High value wirewound units of a new type are being shown by the British Electric Resistance Co., who are also showing high accuracy rotary variable resistors, tropical potentiometers, and laboratory and instrument type resistors. Heating tapes, thermostats and electronic valve retainers are exhibited by Electrothermal Engineering.

Miniature electrolytic capacitors, only 22 mm dia. by 6 mm long, capable of operating over the range —70° C to +200° C with a capacity of 55 μF with a working voltage of 80 V d.c., high permittivity ceramic capacitors, ceramic materials, and Caslam, a core material are all being shown by Plessey, Ltd.

Germanium devices are coming into use in place of diodes and triodes where long life, high frequency rectification and reliability are required. B.T.H. have a high efficiency germanium diode capable of handling increased power. Specially grown single crystals of germanium itself are being shown by G.E.C. and similar examples of germanium refining are exhibited by Marconi's Wireless Telegraph Co., Ltd. A new range of germanium crystal rectifiers consisting of eight different types having widely differing characteristics are available. These are made by Westinghouse Brake and Signal and are mechanically similar and comprise a robust low-loss ceramic tube containing the crystal. The whole is hermetically sealed. S. T. and C. Co. is also exhibiting an experimental amplifier using germanium crystal triodes.

Miscellaneous

It is probably among the miscellaneous items that the more interesting research exhibits can be found. J. Langham Thompson have several pressure transducers, for the remote reading and measurement of pressures. C. F. Casella have devised a machine for counting with accuracy small particles in the range 0·2 to 20μ. This should be useful for assessing the efficiency of dust precipitators. At Muirhead's stand can be seen the Muirhead-Pametrada wave analyser designed originally for the harmonic analysis of complex vibration waveforms such as occur in turbine shafts.

The subject of the sputtering of metallic films on to lenses and other surfaces in conditions of high vacua is strikingly illustrated by the exhibits on W. Edwards' stand.

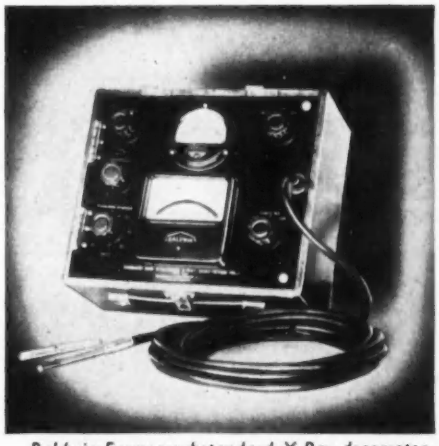
In the computing field, Ferranti's have a slow-speed relay computor designed to demonstrate the technique of automatic solution of logical problems. Also in the computer field are examples of delay lines using the time delay of the magnetostriction pulse in nickel or nickel iron. travelling along a tape or wire. This has been developed by Elliott Bros.

A microsecond counter chronometer by Cinema-Television will measure time in the range from 1 μsec to 1 sec in steps of 1 μsec or with an accuracy of 0·005 + 1 μsec, or in the range 10 μsec to 10 sec in steps of 10 μsec, with an accuracy within 0 005 + 10 μsec.

Salford Instruments have an electromechanical convertor instrument, and a range of iron powder toroids specially developed for use in miniature control equipment used in connection with fluorescent lighting of trains, etc. These are for 400 and 850 c/s and lamp wattages of 10 to 50.

A demonstration by B.T.H. shows a $\frac{1}{4}$ h.p. squirrel cage induction motor running under water, with the windings embedded in polyester resin, and a further demonstration illustrates the use of phosphors converting 2537 Au radiation into long wave ultra-violet for "black light" work. The phenomenon of electroluminescence is also being shown. By a coincidence the same subject has also been taken by G.E.C. for a similar demonstration.

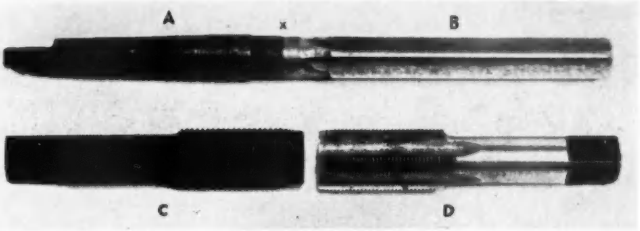
It can, however, be said with confidence that all people concerned with any branch of physical measurement and research will find something to instruct, interest, and in some cases, to amuse them at this exhibition.



Baldwin-Farmer substandard X-Ray dosemeter

Identifying Tungsten Steel

A SIMPLE METHOD for TOOL SALVAGE



OWING to the shortage of tungsten, it has become important to reclaim as salvage worn and broken high-speed tools. Apart from the saving of the tungsten, this is also economically advisable as scrap prices range from ½d/lb for carbon steels up to 7s. 6d. per lb for high-grade tungsten steels.

Some tools are made wholly of tungsten steel, others of carbon steel, and yet others are composite consisting of a tungsten cutting section welded on to a steel shank.

In many cases it is difficult to distinguish by observation the difference between carbon and tungsten steels, and physical or chemical methods are costly. A simple but effective test has, however, been devised by Mr. A. M. Armaer, of the Research Department of Metropolitan-Vickers Electrical Co. Ltd. This depends on the fact that 10-30% tungsten steels are to a large extent resistant to rusting.

The process consists of cleaning a small part of the surface of the metal with an emery wheel or cloth, then wetting it with a strong solution of ammonium chloride in water and leaving it in the air while still wet. In about 15 minutes the carbon steel turns golden brown with rust, while the high-speed steel remains more or less free, depending on the alloy.

In the accompanying illustration is shown a carbon steel shank "A" welded to a tungsten steel reamer "B," and two taps "C" of carbon steel and "D" of high-speed steel. These have been exposed to the atmosphere for some time and the rusting properties can be clearly differentiated. The weld at "X" is a particularly good example of this.

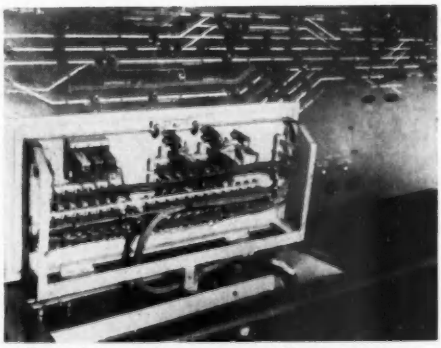
It is not recommended that this method should be tried for the sorting of swarf or tipped tools, as it is not an economic proposition in these cases.

AUTOMATIC TRAIN DESCRIBER

THE line from Liverpool Street to Romford is among the most heavily loaded in the country. To aid in handling this traffic an automatic describer system has been developed and is now in full operation. The system operates over a four-track continuously track-circuited section of line between Liverpool Street and Romford with a four-track branch from Bethnal Green to Hackney Downs, a double-track branch from Bow Junction to Gas Factory Junction and two additional tracks from Liverpool Street to Bethnal Green. Some eleven signal boxes are concerned in the scheme. The positions of the trains with respect to the signals, their description and their destination, are indicated in each signal box by a light-indicator system.

When a train leaves Liverpool Street, Gas Factory Junction, Hackney Downs or Romford to proceed into the operational area, the signalman sets up the appropriate description on a keyboard and interposes it into the signal position next ahead of the train. Operation of the overlap track circuit of this signal passes the description forward and from that time, until the train leaves the describer area, no further manual operation of the apparatus is required.

Various refinements have been added to prevent mal-operation. The equipment was designed, manufactured and installed by Siemens and General Electric Railway Signal Co. Ltd., to the requirements of Mr. A. Moss, Signal and Telecommunications Engineer, Eastern Region.



Part of the equipment opened for maintenance

High-speed Hydro Generators

DESIGN FEATURES CRITICALLY SURVEYED

DESIGN features of high-speed salient pole a.c. generators for water power plants are described in considerable detail in a paper which has been prepared by Messrs. E. M. Johnson, M.Sc.(Tech), M.I.E.E., and C. P. Holder, B.A., A.M.I.E.E. (Metropolitan-Vickers), which was presented to the Supply Section of the I.E.E. on Thursday last. The machines considered are those having a normal peripheral speed of 15,000 ft/min and above, with rotational speeds in the range 300-1,000 r.p.m. At these speeds, peripheral velocity begins to be the determining factor in design, and the segment type of rotor construction is not possible.

Mechanical Construction

Generators of the type considered may have rotor bodies up to 12 ft 6 in. in diameter and up to 15 ft long. A characteristic of all the designs is that the rotor body is sub-divided into a series of discs, this being necessary to ensure homogenous material and to make transportation of the rotor body possible. The component parts may be of rolled, forged or cast steel. Poles can be solid, because the use of a relatively large radial air gap removes the risk of undesirable pole-face losses. The method of attaching the pole to the rotor body is commonly by use of a T-head held in position by tapered keys.

Field coils of large high-speed generators are almost always made of copper strap, sometimes fabricated from straight lengths of copper dovetailed together and brazed. Higher width/thickness ratios of strap are possible than with former wound coils. Furthermore, hard silver-bearing copper, which has good resistance to creep, can then be used. Asbestos is commonly used for interturn insulation; for insulation from earth a mica spool may be bonded to the inside of the coil, micafolium may be wrapped round the pole body, or moulded insulation and flat insulating boards inserted between the pole body and the coil. The sides of the coils are acted upon by high stresses, and are, therefore, held in position by V-shaped clamps inserted between pairs of poles. The clamps are made of steel, bronze, or an aluminium alloy. Special designs of pole shape may be used to obviate the need for these clamps, or wider copper may be used for the coils.

Stator frames for large high-speed generators are usually fabricated, and are frequently subdivided, either to facilitate transportation or to permit removal of the rotor in a confined space. In the latter case the core is correspondingly subdivided.

EXISTING LARGE HIGH-SPEED WATER TURBINES

Country of manufacture	Output	Normal speed	Peripheral speed at normal rotational speed	Runaway speed as percentage of normal rotational speed
	MVA	r.p.m.	ft/min	%
Canada } * England } *	122	327	16,600	189
Switzerland*	55	333	14,400	198
England* ...	62·5	428	14,250	182
Sweden* ...	66	428	16,300	175
France* ...	80	428	16,200	180
Switzerland*	50	500	17,300	184
Germany ...	53	500	15,400	172
England* ...	36	600	15,570	182
Switzerland	30	750	16,200	184
Switzerland?	60	750	16,700	187
France ...	10	1,000	15,100	180

*Under construction

Stator core construction is generally similar to that adopted for high speed turbo-generators. There is a tendency to use non-magnetic end-fingers and spacers in the air ducts, and to apply the newer types of low-loss steel sheets. Even grain-orientated steels may be used in certain circumstances.

Open stator slots can be used without disadvantage, and these are common, in conjunction with the two-layer diamond type of winding. The coils have a pitch of at least 2 ft 6 in. and overall lengths of up to 12 ft or more. Every conductor is divided in depth to limit eddy current losses. Insulation is mica or, when there is also division in width, glass braid or asbestos serving. Since the depth of copper in the conductor may exceed 2 in., transposition may be necessary. End-bracing design may, in the largest machines, approach steam-turbo-generator practice.

Vertical-shaft generators running at high peripheral speeds are usually provided with two guide bearings, one above and one below the rotor. If the turbine is of the Pelton type, the wheel is sometimes mounted overhung on a downwards extension of the generator shaft, but in general, and particularly in the Francis type, the turbine has its own guide bearing, making a total of three for the unit. The

thrust bearing is mounted above the rotor for reasons of accessibility; the design is similar to that adopted for low-speed machines, an important innovation being the use of direct water-cooling for thrust bearings of the fixed pad type.

Water cooling is also coming to be used for the journal bearings of large horizontal shaft machines. Previously the cooling has usually been done by circulating water through copper tubes embedded in the bearing. So far this type of bearing cooling has been applied to a variety of bearings up to 25 in. diameter at 500 r.p.m. normal speed.

Limits of Output

It is emphasised in the paper that outputs much larger than those at present obtained from machines are possible without radical departure from normal design. Assuming a runaway speed of 1·8 times normal, class B insulation, as minimum factor of safety on yield point of 1·5 and a short-circuit ratio of 1·0, then ratings up to 260 MVA at 450 r.p.m. seem possible, after taking into account transport restrictions.

Reactance of large high-speed generators varies from 0·15 to 0·20 per unit for the direct axis sub-transient value, and 0·23 to 0·30 per unit for the direct axis transient value. The lower end of the range corresponds to the higher rotational speeds.

DISCUSSION

PROFESSOR M. G. SAY (Heriot-Watt College), said that in these hard times the British manufacturers of electrical plant were helping us to keep our heads above water. Continental and American manufacturers of the type of plant described in the paper had the tremendous advantage of a market on their doorstep; but to manufacture machines which were almost entirely for export, and of which the design had to be such as to enable them to be erected and run with a minimum of trouble at a long distance from their place of manufacture, must create many problems. It was clear that mechanical considerations would overshadow purely electrical considerations in high-speed machinery; rotational forces rose alarmingly with size, weight and speed.

When comparing possible high-speed ratings of water-wheel generators with steam turbo-alternators of comparable size at comparable speed, it must be remembered that the water-wheel generator must sustain 100% overspeed, and the steam turbo-alternator perhaps only 10%. The diameter of the former, consequently, could be only one-third that of the latter, and its capacity 1/27th. Centrifugal forces would dominate some aspects of the design, and the limiting features appeared to be the dovetail stress in the base of the poles and the yoke or rim stress, which would tend to limit the peripheral velocity at overspeed to about 30,000 ft per min.

MR. L. D. ANSCOMBE (B.T.H.) pointed out that much of the development hitherto of these large high-speed machines had been in the hands of continental manufacturers, but three British designs, by three well-known manufacturers, were now under construction. There was a 70-MVA alternator at 500 r.p.m. now running in Austria said to be capable of 90 MVA, though he doubted whether the prime mover could do this.

The authors rightly emphasised the value of the fabricated field coil for use in these large high-speed machines. Those coils had been introduced into this country by his firm shortly after the end of the war, and up to the present they had completed over 20 machines with them, totalling about 300 MVA, and the results justified the enthusiasm felt for this type of coil. With regard to the future, if the technique of water turbine manufacture could be further improved, there might be a demand for even larger machines.

MR. J. B. YOUNG (English Electric Co.) emphasised the general tendency towards larger kVA ratings from individual units, and the fact that British engineers were ready to play their part in providing them. His firm, he said, were responsible for the 122 MVA, 327-r.p.m. generator being manufactured in this country, which represented a considerable advance in output at this speed. While from the points of view of production and transport 12 ft 6 in. was usually the limiting rotor body diameter, it had been found possible in this case to go to 13 ft 9 in., and on the basis of a core length/pitch ratio of 4·5 the output should be about 160 MVA.

MR. P. G. ROSS (B.T.H.) suggested that synchronous reactance was a better criterion of steady-state performance than the short-circuit ratio which the authors used in their present paper. He also showed a slide which indicated that if a very low transient reactance was required, say, one which was only half the "natural" value, the cost of the alternator increased very considerably.

MR. J. W. POLLARD (Kennedy and Donkin) said that the dissipation of heat from these high-speed rotors might be an important factor in their design, and asked whether hydrogen cooling, would be feasible for these machines.

MR. B. ADKINS (Imperial College) suggested that the benefit obtained from the fabricated field coil tended to be cumulative. As a result of its advantages, it was possible to cool the coil better and also to reduce the height of the pole, and that in turn reduced the leakage across the poles and the stresses in the poles, resulting in an immensely greater saving than was apparent at first sight.

MR. C. P. HOLDER, replying to the discussion, said the question was often asked of why hydrogen cooling was not applied to water-wheel generators. The size of such a generator was usually determined by the requirements of governing or of system stability, and the only advantage of hydrogen cooling would be to reduce the windage loss.

Notes on Wiring
by MEGOHM

Aircraft Obstruction LIGHTING

Details to watch in wiring

WHERE high structures, such as chimneys, in the vicinity of airfields are likely to be a danger to the landing and departure of aircraft during periods of poor visibility and darkness, such structures must be fitted with warning lights positioned so that they are visible from any direction of approach.

The installation of warning lights with tracks for raising and lowering gear and associated trailing flexibles is now being superseded by the installation of permanent cabling terminating in water-tight socket outlets at positions adjacent to the warning lights.

Number of Lights

An installation for a chimney, say, 300 ft high will comprise three warning light units each fitted with four 100-watt lamps positioned not more than 10 ft below the top of the chimney and spaced 120 degrees around its circumference. Another three sets of warning light units would also be similarly spaced and positioned at approximately 150 ft off ground level. The warning light unit will comprise a cast gunmetal body divided into four compartments—each fitted with a porcelain E.S.C. holder and arranged to receive a prismatic ruby glass held in position by a screwed flange plate. The four lamp holders are wired and connected so that lamps Nos. 1 and 2 may be controlled by one switch, lamp No. 3 by a second switch and lamp No. 4 by a third switch. A flexible circular p.v.c. sheathed cable is brought out through the gunmetal body via a water-tight cable gland and connected to a water-tight plug. The complete unit is mounted on a gunmetal bracket which can be easily fitted to or released from the structure and the angle of the unit in relation to the structure may be fixed at any desired angle from the vertical plane.

The cabling installation to the warning lights will comprise a multicore 0·0045 circular weather-proof cable which may be metal sheathed, insulated sheathed, or both. The type of cable to be used will be determined by local atmospheric conditions and in bad areas it may be desirable to cover the metal sheathing by protective servings. A length of multicore cable equal to the height of the chimney less 10 ft should be made off at one end into a substantial gunmetal box. From this box three multicore cables should be connected to three water-tight socket outlets, each cable length being just sufficient to allow the sockets to be fixed adjacent to the warning lights. The cable connections in the box and to the socket outlets can then be made off to enable the sequence of switching described to be effected. After completion and testing the connections, the boxes should be filled with compound and the complete cable assembly with boxes attached should once again be tested before being hauled up into position and fixed to bolts and cleats already set in position on the chimney.

A second cable assembly with boxes as above will also be required for the three sets of warning light units positioned at the 150-ft level. The multicore down lead cable for the warning lights at the top of the chimney and the down lead cable for the half-way lights will be connected to a control box, fixed in a convenient position at the base of the chimney. The control box should be of weatherproof construction fitted with six 5-amp switches, six 5-amp fuses, one neutral bar, one 2·5 kVA 240/220, 210, 200 V d.w. transformer, one 15-amp s.p.n. m.s.f. and cable gland for the incoming supply cable. Tappings on the secondary winding of the transformer will enable 240 V G.F. lamps to be used and under run, increasing the life of the lamps without materially affecting visibility.

Emergency Arrangements

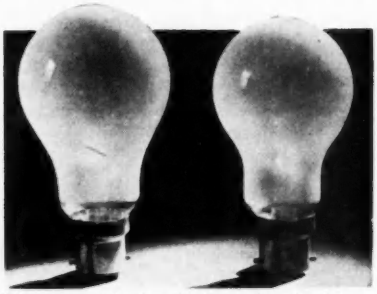
The use of a d.w. transformer, however, will prevent the connection of the system to an a.c./d.c. emergency supply service and should this service be available I would say in such cases it would be preferable to use resistors to break down the voltage applied to the lamp terminals and so enable the system to be connected to the a.c./d.c. emergency supply service.

Metal-clad cables to the warning lights should be solidly bonded to the lightning conductor installation at the top, half-way and base of the chimney, and be insulated from the earthing system for other services.

E.L.M.A. INTRODUCTIONS

TWO new standard items will shortly be available from E.L.M.A. members according to information released this week. The first is a smaller 60 W tungsten lamp, and the second a circular fluorescent lamp which is claimed to be a complete innovation.

In the case of the tungsten filament lamp, it is proposed to make 60 W G.L.S. lamps, both single-coil and coiled-coil, in the same dimensions as the present 40 W lamps. The illustration shows the relative sizes of the new and old lamps, and emphasizes the economy in raw materials and packing space that will become possible. Tests have proved that the new lamp has the same high efficiency as the present design, and E.L.M.A. has approached the British Standards Institution with a view to making the new design standard.



The contrast in sizes is shown in this picture

Circular Fluorescent

The circular fluorescent lamp is the result of laboratory research by E.L.M.A. members, and its leading dimensions are 16 in. outside diameter and 32 mm tube diameter. Rated at 40 W, it uses the same auxiliary gear as the straight 4 ft 40 W tube. A special holder for the 4-pin cap has also been produced.

Yellow is the colour chosen for this new lamp, which is to be marketed from July 1 at a price of 35s., plus tax.

The Batti-Wallahs' Ladies Night

THE Batti-Wallahs' Ladies Night, held this year at the Connaught Rooms, London, amply fulfilled the high expectations of members and guests, the evening proving most enjoyable to all present. As is usual on this occasion, the speeches were short, witty, and well delivered.

Mr. Alan N. East, C.B.E., undertook the task of proposing the toast of "The President of the Society and His Lady." He humorously congratulated the I.E.E. on following the Batti-Wallahs' example in electing Sir John Hacking to their presidency, and outlined the essentials of a president as being the possessor of a dress-suit and a robust digestion. Sir John Hacking, who replied, remarked on the extraordinary difficulty of replying to a personal toast. Toasts to the Industry, the Institution or even the Guests proved no difficulty in answering, as there was always some point which could be put over or needed ventilating. He appreciated the honour of being elected President of the Batti-Wallahs. He had thoroughly enjoyed his term of office and he thought they had had quite an entertaining list of speakers. Not until the end of the session had he had any trouble in securing their presence.

Mr. Forbes Jackson, in his own inimitable way, proposed the toast of "The Ladies," which in true naval fashion he reworded as "Sweethearts and Wives," and Lady Hacking replied.

Sir John and Lady Hacking receiving Mr. and Mrs. W. N. C. Clinch and Lord and Lady Citrine

Problems and Practice IN ENGINEERING

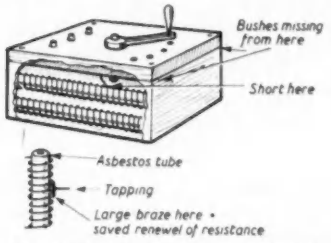
Seasoning Exciter Commutators

THE seasoning of commutators is an important process, and manufacturers have different workshop processes. The temperature of the commutator is raised to between 100° and 130° C and then while hot it is run at a speed of about, or just above, normal, so that all bars that can move are driven out by centrifugal force either on account of their places or of pockets of shellac in the mica vee rings. The bolts are then tightened up and the commutator surface is ground. The grinding and burnishing of a commutator calls for due care if a satisfactory surface is to be ensured. Some manufacturers appear to have discontinued the practice of burnishing. This process was carried out by means of a hardened mild steel wheel of similar dimensions to the abrasive stone used for grinding. It was contended that this process hardened the commutator segments and avoided repeated grinding, thereby increasing the useful life of the commutator. The most satisfactory results appear to have been obtained when burnishing was carried out with the armature running at or about half the normal speed.

After an exciter commutator has been subjected to grinding, it is advisable to apply the electrical load in small increments until the normal skin or surface is obtained. It would appear that during the process of grinding the copper is subjected to frictional heat and this somehow affects its nature. A process of stress relieving should, therefore, follow grinding before applying anything near full electrical load to the exciter commutator. Pronounced sparking, chattering and vibration have been known to follow grinding when the machine has been loaded too rapidly. In some cases the armatures have been removed from the machines and turned in a lathe (commutator speed of 300 ft/min) with apparently quite good results. Turning is more efficient than grinding for removing much metal, but grinding gives a better surface finish when only a little metal has to be removed. The final grinding of a commutator should be done at normal speed as a certain amount of "whip" occurs, therefore, the soundness may not be perfect if carried out below normal speed. For turning, the speed should not be too high, a high speed causing a rough cut. A commutator speed of about 1,000 ft per min and a grinding wheel speed of about 50-ft per min in the reverse direction of rotation, have been suggested.—*M.I.C.E.*

Automatic Starting

I WAS called out to a machine shop to attend to a 10 h.p. d.c. starter. It was apparently a secondhand one just fitted up and the maintenance man stated that when he first switched on and moved the starter-arm over the studs, the motor got away fairly smoothly. This occurred five or six times but then the motor jumped away to about half speed with the main switch on and the starter handle right back on its stop.

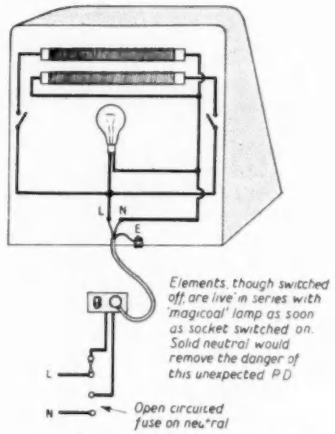


Details of starter construction and fault

On stripping it down it was apparent to me what had happened. Whoever had built the starter up last had left out the bakelite bushes which should have gone between the faceplate and the starter case and this brought the main bolt which held the starter handle in close proximity to one of the middle banks of resistances. So after four or five continuous starts the Eureka wire had warmed up and expanded a little, touching the centre bolt and sticking to it, so that at the next attempt to start as soon as the main switch was put on there was a circuit with about half the resistance banks shorted out. Luckily the short was right opposite a tapping and although the wire was broken a large braze opposite cut out the broken turns. So by fitting new bushes under the faceplate all was well. This starter had probably been checked on the lamps leads by whoever overhauled it and not given a thorough test under actual working conditions.—*J. H. Wales.*

Single Pole Fusing

THE adoption of single-pole fusing on a.c. supplies seems surprisingly slow in taking effect, and, daily, contractors apply for connection of d.p. switch and fusegear. Although the existence of s.p. fusing is generally known,


L
N
E
Elements, though switched off, are live in series with 'magicoal' lamp as soon as socket switched on. Solid neutral would remove the danger of this unexpected P.D.
L
N
Open circuited fuse on neutral

This circuit illustrates the problem of d.p. fusing discussed in the accompanying note

the continued acceptance of d.p. gear in some districts is responsible for the surprise and consternation of contractors when asked to change or convert gear to suit the supply as per I.E.E. regulations in areas inclined to observe 111(a).

It has been my experience to be asked for an explanation of the advantages of the method, and generally point out

(1) Dangers of cross circuiting removed.

(2) Current flowing hazardously through earth fault when neutral fuse blown (d.p.) where solid neutral could minimise danger by maintaining complete installed path of negligible impedance.

(3) Removal of the danger of shock from a radiator after neutral fuse became open-circuited as illustrated.—*C. Spalding.*

Lightning Trouble

AN industrial power station and system was connected by an overhead 11 kV line to the "grid" connected major station and the interconnecting feeder was used as a stand-by for the industrial station. The supply at the big station was handled by ironclad truck type gear, the truck on the feeder concerned being only racked in when required. After several months of idleness, i.e. feeder not in use, the consumer requested that the line should be made "alive" and the switch truck was racked in. When the switch was closed there was a violent report and the switch tripped heavily. On racking the truck out the insulating material inside the cable end spouts was seen to be badly damaged by the flash-over.

This caused considerable concern as the gear was part of a long switchboard that had never given any trouble. However, after long investigations it was discovered that most of the overhead line had been insulated for 33 kV and part of it crossed some high hills where thunderstorms had been fairly serious. It thus became evident that the line had become charged up and, failing to jump across the insulator strings, had punctured the cable end spout linings on the switchgear. Provision of suitable arrestors at both ends of the line, following the mishap, safeguarded the switchgear from any further trouble.—*H. T. W.*

Hot Water Cylinder

DUE to a fault in design of an electric storage water heater of the combined cistern pattern an apparent leakage in the lower cylinder developed and it was only by constant observation that the fault was discovered and the removal and dismantling of the complete unit prevented.

In the design, the expansion pipe from the hot cylinder passed through an outlet in the cold water cistern, made by copper pipe of a larger bore and extending well above the water level. To make a seal between these two pipes only a rubber ring was pressed into the space between them and, due to the heat of the expansion pipe and the relative movement of two pipes this rubber ring had perished.

At times when hot water was being used or immediately after being used, a discharge of air and water took place from the expansion pipe and most of it trickled down between the two pipes, eventually filtering through the cork insulation and appearing as a pool all around the base of container.

A complete cure was made by sweating on two right angle copper bends which discharges any water well clear of the expansion pipe.

This is a case in which I consider the designers have missed an obvious weakness.—*S. A. Wilson, Assoc. I.E.E.*

Contributions to this page dealing with specific items of interest to electrical engineers and maintenance men are welcome, and, if accepted, will be paid for at our standard rates. Problems of a practical nature to which a solution is required will also be considered. Contributions should be written on one side of the paper only and may be accompanied by sketches, which will be re-drawn for publication.

Fifty Years of Street Lighting

PROGRESS OF ELECO IN THE FITTINGS FIELD

SOME 50 years ago the Gilbert Arc Lamp Co., of Chingford, was established to introduce the benefits of the "electric light" to the illumination of streets. Among the early schemes carried out by this company were the lighting of the City of London and the Victoria Embankment. Just before the First World War, the works were transferred to St. Albans, and the firm bought up the Davey Arc Lamp Co., and changed its name to Engineering and Arc Lamps, Ltd. During the following years considerable expansion took place and resulted in a further reconstruction in 1920, when the company adopted its present title of the Engineering and Lighting Equipment Co., Ltd. About this time the tungsten filament lamp had attained popularity as a light source in preference to the arc lamp, and the company took advantage of this to move into the tungsten-type lighting fittings field. From 1920 to 1939 was a period during which the battle between gas and electricity was waged without quarter on both sides, and substantial progress was made by the latter. The gas discharge lamps—both mercury vapour and sodium—were developed for main road lighting, and again new and improved fittings had to be devised to enable these light sources to be used to the best advantage. "Eleco" played its full part in this important field and was responsible for several important installations.

By 1935 an important connection was established with the Admiralty, initially on the provision of watertight fittings, but as time went on this began to cover a very wide range of electrical equipment for H.M. ships. In 1939, the organisation changed its structure from a private to a public company and exists in this present form today.

Present Production

Although of medium size the factory is organised for a remarkably high output and, in fact, produces an extensive range of equipment both for home and overseas markets. Of the Admiralty work, comparatively little can be said, as it covers such a diversity of items. Main controlling switchboards, fuse holders, connector assemblies, watertight junction boxes, switchgear assemblies and instrument panels are among the many items produced for the service. The lighting side is, however, the better known to the electrical industry in general. In this field most of the fitting bodies are bought from outside being of die-cast aluminium construction, and the glassware or Perspex has also to come from outside. The firm, however, possesses a small but efficient non-ferrous metals foundry as well as an iron foundry, and is thus in a position to overcome temporary shortages or over-long delivery dates which might otherwise hold up the production line.

A section of the Southend road lighted with Golden Ray Mk 1 fittings for sodium 140 watt lamps

Particular care is taken in the finish of the fittings which are completely weatherproof. Prior to painting, the castings are thoroughly de-greased by the trichlorethelyne process, and after painting are stoved by infra-red heating to produce a hard and durable surface finish. To protect the optical systems, a double gasket arrangement is used which seals the prisms from the effects of atmospheric conditions and thus maintains the efficiency of the fittings and reduces maintenance costs.

Lamp fittings are at present confined mainly to sodium mercury and tungsten light sources, as the present restrictions on capital expenditure and the attitude of many street lighting authorities militate against the development of fluorescent lamp fittings as a production design.

Among current production, for home and abroad, the new styled "Welwyn" for 60 W-200 W gas-filled or 80 W-125 W mercury is worthy of note because of its easy maintenance and attractive appearance. Other fittings, well known to lighting authorities, are the Golden Ray series for sodium vapour. These represent only a small fraction of the models available, which cover all requirements for street lighting purposes.

The high reputation of the firm is exemplified by the fact that not only do they produce fittings for other important, electrical concerns, but also have a heavy export trade with places so diverse as New Zealand, Kenya, Portuguese West Africa, India, Kuwait and Australia.

The End of the Kingsway Subway

LAST TRAM RUNS ON SATURDAY THROUGH THIS UNUSUAL TUNNEL

ON Saturday, 5th April, the last tram will travel through the Kingsway subway, for many years the most important connecting link between the north and south London tram system. This virtually brings the tram system of London to an end, with the exception of some sections in south London.

In view of this, to some people, regrettable victory of the petrol or oil-driven bus over the electrically powered vehicle, some historical facts concerning the tram tunnel may be of interest.

In 1899 a scheme for linking the north and south sections of London, from Finsbury Park to Westminster, by tunnel was first proposed. Investigations abroad, however, combined with the projected Kingsway thoroughfare, caused this scheme to be abandoned in favour of a link from Theobald's Road to the Victoria Embankment. This scheme, for single-decker cars, was carried out in two stages; the first from Theobald's Road to Aldwych, being opened to traffic in February 1906, and the connecting link from Aldwych to the Embankment being finished in 1908. The overall length of the subway was about five-eights of a mile.

From the start it became apparent that the subway would have been of much greater use had it been capable of carrying double-decker trams. It was not, however, until 1930 that the work of enlargement was begun. This necessitated extensive reconstruction and cost about £171,000, compared with the original work which cost about £250,000. During this reconstruction the two stations at Holborn and Aldwych were completely modernised and enlarged, considerable attention being paid to the lighting.

At the moment no conclusions have been reached regarding the use to which the subway will be put. Road traffic is precluded to a large extent by the sharp bends involved, and by the fact that a section of the subway is divided into two separate tunnels for up and down traffic.

The Embankment Portal under Waterloo Bridge

Planning for Abnormal Loads

Successful Arrangements Carried out in 2 mins. "Silence"

IN pre-war years, the annual Armistice Day ceremonial was always regarded with apprehension by generating station staff, due to the rapid fall and rise of load caused by the "Silence." In those days, the Grid areas, usually operated as self-contained units and thus the effect of any consequent line disturbance could be isolated as far as the country was concerned. With the transfer of Armistice Day to a specific Sunday, this difficulty ceased to exist. With the Grid running all areas in parallel, however, the situation became most delicate on the occasion of the "Two Minutes Silence" held to mark the funeral of H.M. King George VI.

Planning

Careful planning ahead was required to ensure sufficient flexibility for the system to cope with the rapid changes in load, frequency and steam pressures which would occur. Some of the smaller stations were given programmes for decreasing generation over a period of ten minutes or more prior to the silence and for raising the generation immediately after. Other stations continued full generation, but stood by for a fall, whilst some of the remainder dropped load and stood by for a rise. Another method adopted in some areas was to give a prearranged import or export programme so that generation had to be reduced and picked up again in order to follow the change in local conditions.

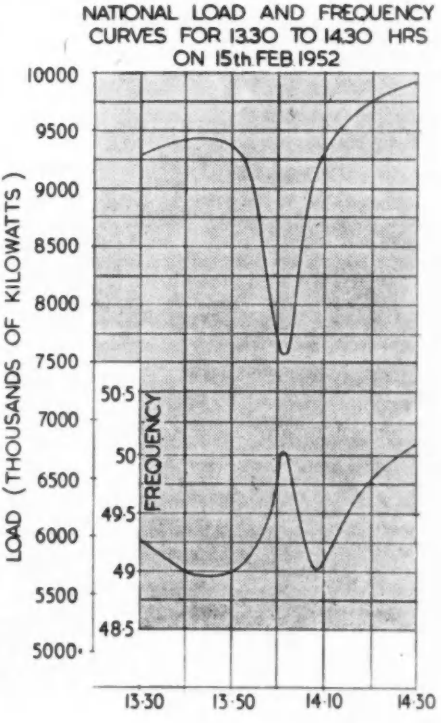
In order to be able to deal with circumstances as they arose, in addition to this programmed planning, certain stations stood by to drop load and pick it up in accordance with telephoned instructions. These stations were selected for the suitability of the installed plant to pick up or drop load rapidly, the change amounting to 50% in some cases.

As these arrangements were based on estimates, it was thought advisable to retain some plant running with low boiler pressure. This enabled them to drop off greater load than that programmed, and the build up in steam pressure during the "Two Minutes Silence" would allow them to pick up load rapidly.

Just before the "Silence," while these programmes were coming into operation, the system frequency was rising rapidly, thus tending to reduce the rapidity and magnitude of the drop in demand. Similarly, after the "Silence" the frequency dropped with a similar effect on the rise. Although the true effect of this was difficult to assess, it is estimated that without it the national load would have fallen by about 21%. The actual fall registered was 19%.

The frequency varied from 49 c/s before the "Silence" rising rapidly to just over 50 c/s during the "Silence," then falling almost to 49 c/s as the load returned and finally exceeding 50 c/s as the reserves came into operation.

Throughout the period, due to complete co-ordination between station engineers and operation and control staffs, the situation remained fully under control, and no boiler valve lifted even under the worst circumstances when the demand was falling. In fact, the most critical phase occurred in load restoration when at one period the load was rising at a rate over 330 MW/min, and the frequency at 0·25 c/s/min.



overseas news

More Delay in N.S.W.?

The serious delays in constructing the new Pyrmont power station, N.S.W., have become notorious, but now there is disturbing news that the State's big Lake Macquarie power station "is years behind schedule." Although when the State Cabinet approved the construction of the power station in 1947 it planned that the first section of 100 MW should be operating by the end of this year, an inspection of the site a few days ago showed that men were still working on the foundations for the first section and excavating ground for later sections, it is reported. And thousands of tons of steel exported from England on priority is stacked in heaps near the site. Reasons advanced for the delay at Lake Macquarie have included bad weather and a shortage of labour, while a six-mile railway line has not been completed, causing double-handling of materials. Mr. W. A. Anderson, secretary of the N.S.W. Railways Department, who have carried out the work so far, has agreed that the major delay occurred in the initial stages when heavy rain retarded progress for some time. The station itself is being built on 40 ft concrete piers sunken into the bed of a watercourse. The first sod for the project was turned by the Premier, Mr. McGirr, in July, 1948, although at that time the actual site of the station had not been settled.

Power to Ration

Under a Bill to be introduced by the State Government this session, the Hydro-Electric Commission of Tasmania is to be given permanent powers on electricity rationing. In the present Act, which expires on June 30, the Commission's power to ration was limited to just over 12 months, but the Government considers that the Commission should retain the necessary authority in case of future need. It is not anticipated that there will be further power restrictions this year. In 1954 the Commission believes there will be sufficient power to meet most of the demand, and that it will be possible either to lift or considerably ease restrictions.

A Hire-Purchase "War"?

Federal Government action to prevent a spread of price wars in electrical appliance and other fields was suggested in the Canadian Commons last month by Mr. Ross Thatcher, a retail hardware merchant from Moose Jaw, Saskatchewan. He declared that "fictitious" trade-in allowances offered on electrical appliances and predatory price wars in some centres were driving small retail merchants into bankruptcy. The Government should insist on a down payment of at least 20% in cash, he maintained. Under existing regulations the trade-in allowance is counted as part of the one-third down payment required under the hire purchase restrictions. We have, in fact, seen instances of Canadian stores offering a trade-in allowance of up to $75 on a $189 washing machine, and of up to $150 on a $519 refrigerator. These are offered on "anything from an old hat to a broom".

Telling Winnipeg

Some 75,000 copies of a new pamphlet, "Facts About the Power Problem," have been circulated to electors in Winnipeg as part of the plan to explain the proposed provincial power set-up on which they are asked to vote on April 16. The pamphlet contains 32 questions and answers on the various points at issue, starting with the immediate power problem, Plan "C," the future of the City Hydro, and alternatives. In the circumstances it may be difficult to discuss the matters impartially, but from this distance it does seem that the information given is rather biased in favour of Plan "C." Apart from this pamphlet, the "educational" campaign includes newspaper advertisements, broadcasts from four of the city's radio stations, public meetings, and a publicity office at the city hall. And, of course, that has produced some squabbling over the city bearing the cost of such a campaign.

Long Line

In Nelson, British Columbia, the first of three power conductors which will form the world's longest overhead span has been strung across Kootenay Lake. The 10,656-ft span links the east and west shores of the lake in the 87-mile transmission line between south Slocan and Kimberley. The $3,000,000 line will furnish power for Consolidated Mining and Smelting Co. and the new $9,000,000 fertiliser plant being erected near Kimberley.

A River Project

A Royal Commission is shortly to hold meetings to ascertain the economic feasibility of the proposed South Saskatchewan River irrigation and power project. The scheme calls for the construction of an earth dam 210 ft. high and 1½ miles long across the South Saskatchewan River below Saskatoon to create a 135 mile lake. Power installations at the dam would produce 435 million kWh annually, it is estimated, but as irrigation developed, the output would drop to about 395 million kWh. Based on 1947 estimates, the undertaking would cost $103 millions of which the Federal Government would provide $68 millions and Saskatchewan $35 millions, but

it is suggested that $125 millions at least is a more realistic figure now. Engineers have determined that the project is feasible from an engineering point of view, but the Royal Commission is to try to ascertain whether the economic benefits would warrant the expenditure.

Quebec's Scheme

Plans for new installations costing about $10,000,000 over the next five years to provide power for new industries, was referred to by Mr. J. A. Fuller, president of the Quebec Power Co., at its annual meeting recently. He said the industrial growth of the area served by the company warranted the expansion. Each month more industries were attracted to Quebec. Altogether 3,110 new consumers were connected during 1951, he said, and the average annual consumption and farm consumers amounted to 1,848 units as compared with 1,583 in 1950.

Greek Station

Under the economic collaboration agreement signed between Italy and Greece in August, 1949, Italy has been entrusted with the construction of a hydro-electric plant on the Louros river near Yannina, in north-west Greece. A dam 45 ft high and 330 ft long is to be built, and power plant of 5,000 kW capacity installed. Although this scheme is the smallest of three hydro-electric projects in the Greek power development plan, it is expected to meet the needs of the entire Epirus area for a number of years. Initially to be operated as an isolated system, it may eventually be connected with the grid transmission scheme now under construction in other parts of the country.

Tenders Wanted

Salisbury City Council, Southern Rhodesia, has decided to invite tenders from the U.K., Southern Rhodesia and the Union for the erection of stage 1 of the Council's proposed No. 3 power station. During discussion, it was suggested that tenders should be for world competition. Later, it was said that it would be unfair to ask firms to tender, at considerable cost, when the Council did not require a great number of tenders. Alderman L. B. Fereday said that the Council was probably unanimous in the opinion that the contract would be given to a British firm. On these grounds he felt it unfair to call for tenders from foreign countries. It was estimated that the cost of tendering for such a project was £2,000.

Another Scheme

Following an inspection of the Krishna Valley, Ramapadasagar project site and Godavari delta area, two members of the Technical Committee of the Indian Planning Commission have intimated that only the Krishna river valley scheme would be recommended by the Committee for inclusion in the first five year plan. The Ramapadasagar project is a combined irrigation and power scheme. It provides for the construction of a dam 428 ft high, where generators of a total capacity of 150,000 kW could be installed.

Another Station

Officially inaugurating new generating plant for the Multan Electric Supply Co. last month, the Pakistan Prime Minister pointed out that as long as a shortage existed, the control of electric power would have to be exercised by the Government. The latter would arrange training facilities abroad for the operating staff of supply companies if they so desired, he added.

Sawdust fired Gas Turbine

Combustion efficiencies of 92·5 to 99% have been obtained with a sawdust-fed gas turbine developed at the Oregon Forest Products Laboratory of Corvallis, Oregon. Heat release rates up to 900,000 B.Th.U. per square foot-hour based on grate area and 200,000 B.Th.U. per cubic foot-hour based on furnace volume, were realised in the laboratory furnace, it has been stated. Based on grate area, it was claimed this heat release volume was about three times as high as that in most sawmill installations producing steam from hogged fuel. Based on furnace volume, the heat release is about 15 times that usually obtained in most boiler installations using wood fuel. An experimental unit was constructed and has been in operation since November, 1950. It is an open-cycle gas turbine, using a waste wood-fired combustion system comprising an underfeed stoker supplied with undergrate air, overfire air jets, and dilution air admitted above the furnace.

Cut Off The Power!

Threats of possible disconnection of supplies because of over-consumption of electricity, have been sent out to over 1,200 consumers by the Auckland Electric Power Board, New Zealand, during the past two months. Apart from these warnings, the Board has already sent out 47 notices of disconnection, most of which have been carried out. Among the commercial consumers, their alleged offence has been in respect of the regulations limiting shop window and under-verandah lighting. But some action has become necessary, for it was found from meter readings that too many people have been using more electricity than they should have done.

Power Position

The North Island, N.Z., will enter the coming winter with less water storage in the lakes feeding hydro-electric plants than it did in the severe winter of 1948, it is reported. Yet the power demand has increased by at least 15% in the intervening years, so officials fear that power cuts will be inevitable at peak periods.

PERSONALITIES

IN THE INDUSTRY

The President for 1952-53 of the Electrical Power Engineers' Association is **Mr. J. L. Moss,** A.M.I.E.E., section engineer (operations and maintenance) in the North Eastern sub-area of the London Electricity Board. Before nationalisation he was mains and public lighting engineer to Stepney Corporation, having previously served for some years in various positions on the mains staff of Barking Corporation. Mr. Moss was educated and trained at West Ham and East Ham Technical Colleges and with the Barking Electricity Department. He has a long record of local service behind him in E.P.E.A. affairs, and in recent years has come increasingly to the front in the national leadership. He is also a member of the National Joint Board and of the National Joint Advisory Council for the Electricity Supply Industry.

Mr. J. L. Moss

New appointments in connection with all three of the Henley cable factories are announced by W. T. Henley's Telegraph Works Co. Ltd., **Mr. J. H. Savage,** M.I.E.E., A.M.I.W.M., is appointed works manager of the Company's parent works at North Woolwich, with **Mr. J. C. Duggan** as assistant works manager; **Mr. S. J. Wilson** is now the general works manager at the company's Gravesend works; and **Mr. A. T. Winder,** M.I.W.M., is appointed works manager of the company's newest factory at Birtley, Co. Durham, with **Mr. E. Beetlestone** as assistant works manager; all of the foregoing appointments date from April 1. The company also states that **Mr. A. W. McArthur,** M.I.E.E., F.I.W.M., who has been works manager in charge of the cable factories at Woolwich and Birtley, retired at the end of March but retains his directorship with special duties in connection with those factories. Another who retired on March 31 is **Mr. E. E. Judge,**

Mr. A. W. McArthur

Mr. E. E. Judge

A.M.I.Mech.E., general works manager at Gravesend, who retains his technical directorship of Oakley Brothers Ltd., a Henley subsidiary company. He is also retained for special duties at the Gravesend works and Oakley Brothers Ltd., foundry at Cradley.

Mr. J. F. H. Tyler, B.Sc.(Eng.) has been appointed signal and telecommunications engineer, Western Region, British Railways. He started in the Signal and Telegraph Dept. of the Southern Railway in 1925, and subsequently served with the L.P.T.B. and the L.N.E.R., where he was responsible for the planning side of the re-signalling for the Liverpool Street-Shenfield and Manchester-Sheffield-Wath electrification schemes. He was also responsible for planning and installing the first sequence switch interlocking installation at Doncaster until the work was closed down during the war. In 1947 he joined the former Great Western Railway as assistant to the signal and telegraph engineer.

The Earl of Verulam has been appointed a director of the Engineering and Lighting Equipment Co., Ltd.

Mr. J. H. Savage

Mr. S. J. Wilson

Mr. A. T. Winder

For some time assistant works superintendent at the Peterborough factory of the Hotpoint Electric Appliance Co. Ltd., **Mr. R. W. Todhunter** has been appointed to a similar position at the Birmingham factory of the company. He was recently presented with a three-piece pewter tea service by foremen and supervisors at the Peterborough factory canteen.

Sir John Hacking, deputy chairman (operation), British Electricity Authority, recently paid a visit to several of the North Western Division's new installations. The first visit, in company with **Mr. C. E. H. Verity,** deputy chief engineer, was to Trafford generating station, where the 15 MW gas turbine experimental plant was inspected. Further visits were also made to new stations under construction at Huncoat and Carrington. Our photograph shows Sir John at Huncoat; on the right is **Mr. A. R. Cooper,** and, back to camera, **Mr. J. Whitfield.**

At last week's meeting of the Electric Light Fittings Association, **Mr. K. Scott Adie,** governing director of Rowlands Electrical Accessories, Ltd., was elected for a third successive year as chairman of the Association.

Mr. K. Scott Adie

Mr. P. A. Griffin, B.E.(Hons.), A.M.I.E.E., first assistant electrical engineer to the Central Waikato Electric Power Board, New Zealand, has been appointed engineer to the North Auckland Electric Power Board in succession to **Mr. T. R. Overton,** M.I.E.E., M.N.Z.I.E., who has resigned to enter consulting practice in Auckland. Prior to joining the Central Waikato Electric Power Board in 1948, Mr. Griffin was with the N.Z. State Hydro-Electric Department, Wellington.

Mr. Leslie Gamage, vice-chairman and jt. man. director of G.E.C., with his wife, the Hon. Mrs. Leslie Gamage, arriving at London Airport after a 10-weeks business tour of Rhodesia and South Africa

Mr. Roger Falk, O.B.E., lately director-general of the British Export Trade Research Organisation, has joined the staff of Production Engineering, Ltd., the firm of management consultants, to take charge of the marketing side of their organisation work.

Long Service Certificates have been presented to three Devon employees by Mr. S. F. Steward C.B.E., chairman of the South Western Electricity Board. They are **Miss E. L. Willcocks** and **Mr. T. N. I. Adams,** of Plymouth, and **Mr. E. R. Giles,** of Torbay. At Plymouth, Miss Willcocks has served for over 35 years and Mr. Adams for 40 years. (The latter, incidentally, was the first jointer in Plymouth to make a 33 kV joint.) Mr. Giles started with the former Paignton Electric Light and Power Co. in 1911 and, except for four years war service, worked at the power station until 1936, when he became tariff assessor.

Latterly with Graham and Edgar Bell, consulting engineers, **Mr. J. R. R. Devereaux,** B.E., A.M.I.E.E., A.M.N.Z.I.E., has been appointed engineer to the Bay of Islands Electric Power Board, New Zealand.

Mr. Felix L. Levy, a director of George Cohen Sons and Co. Ltd., and its associated companies, has been elected president of the London and Southern Scrap Iron and Non-ferrous Metal Merchants Association. This office was for a number of years held by his father, Mr. Lawrence Levy, who was also a director of George Cohen's.

Members of the Blyth (Northumberland) staff of the North-Eastern Electricity Board have made a presentation to **Mr. A. McPherson,** A.M.I.E.E., to mark his recent retirement from the post of assistant district engineer. Mr. McPherson had served in the electricity supply industry for 33 years, of which 29 years were spent at Blyth. Mr. McPherson's successor is **Mr. John Rutherford,** of the planning and development section of the Tyne District of the North-Eastern Electricity Board, we understand.

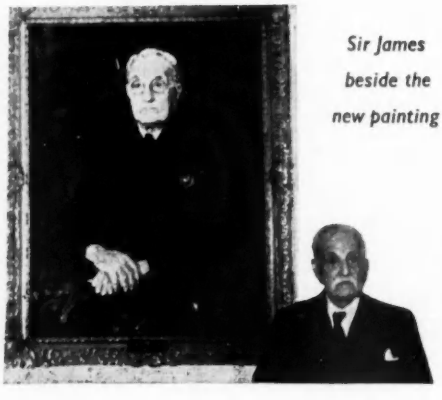
The council of the Institute of Transport has elected **Mr. C. T. Brunner** president of the institute for 1952-53 and he will assume office on October 1 upon the retirement of **Mr. A. B. B. Valentine.**

Formerly general manager of W. T. Glover and Co., Ltd., **Mr. D. T. Hollingsworth,** A.M.I.E.E., has rejoined British Insulated Callender's Cables, Ltd. as chief engineer. Before going to Glover's early in 1950, Mr. Hollingsworth was cable research manager to B.I.C.C. He originally joined the old Callender's Cable and Construction Co., Ltd., in 1925 as a works trainee, and subsequently held positions in various departments. Following the merger between Callender's and B.I., he became cable research manager. In his new capacity as chief engineer he is responsible for applied research and the design and engineering application of all products manufactured by B.I.C.C.

Mr. D. T. Hollingsworth

On Tuesday of last week, the Lord Willoughby de Broke, M.C., A.F.C., Lord Lieutenant of Warwickshire, on behalf of H.M. the Queen, presented the B.E.M. to **Mr. P. G. Hibbs,** who has worked in the Pattern Shop of the British Thomson-Houston Co. Ltd., Rugby, for nearly 50 years. The award was announced in the New Year's Honours List.

Our accompanying photograph is of a portrait of **Sir James Swinburne,** BART., F.R.S., M.Inst.C.E., M.I.E.E., by Mr. T. C. Dugdale, R.A., R.P. The portrait was commissioned by the directors of Bakelite Ltd. (of which Sir James is now honorary president—he was chairman until 1948), and was unveiled by Lady Swinburne recently after a luncheon to celebrate Sir James's 94th birthday. Sir James was one of the earliest workers in this country on phenol-formaldehyde resins — he founded, in 1904, the Fireproof Celluloid Syndicate, a forerunner of Bakelite Ltd. He also holds the honour of being the senior past-president of the I.E.E., having been president in 1902/3.



Sir James beside the new painting

OBITUARY

Mr. P. G. Spary, B.Sc., M.Eng., M.I.E.E., A.M.Inst.C.E., M.A.I.E.E., head of the Electrical Engineering Department of University College, Southampton, died on March 26. He had been at Southampton since 1919, going there originally as lecturer in the Electrical Engineering Dept.

Mr. D. M. Touche, chairman of Atlas Electric and General Trust, died on March 25.

We offer our sincere condolences to **Mr. S. B. Donkin,** M.Inst.C.E., M.I.Mech.E., M.I.E.E., senior partner of Kennedy and Donkin, on the death of his wife, Phoebe, on March 25.

Mr. C. N. Whitfield, of the Newcastle-on-Tyne electrical contracting concern of that name, died on March 26, aged 40.

Sir Andrew Rae Duncan, G.B.E., who had been chairman of the British Iron and Steel Federation since 1945, died on March 30, aged 67. To the older members of the Electrical Industry he was very well known primarily for his association with the Central Electricity Board, of which body he was appointed chairman at its inception in 1927, holding that office till 1935 when he became independent chairman of the British Iron and Steel Federation. But he continued to serve as a member of the C.E.B. till 1940. To Sir Andrew Duncan was due, without doubt, much of the credit for the sound foundation on which the C.E.B. was built. He went to the C.E.B. without any electrical technical knowledge, but organisation and administrative ability were his strong suits. He did, in fact, occupy the post of chairman of the Board in a way which evoked admiration from all who were connected with the electricity supply business—even from those who originally opposed the idea of the grid scheme. And there are now many who regret his passing. Born at Irvine, Ayrshire, he began his career as a partner in a legal firm at Glasgow, and was called to the Bar. He came to London to act as secretary to the Shipbuilding Employers' Federation, and his appointment as coal controller commenced in 1919. Sir Andrew also acted on many Courts of Inquiry into Labour disputes, and on Royal Commissions.

Sir Andrew Duncan

Wills.—**Mr. P. C. Ebner,** A.M.I.E.E., formerly borough electrical engineer at Shoreditch, left £3,990 gross (£3,851 net value).

Mr. Walter Riggs, M.B.E., M.I.E.E., chairman of Girdlestone and Co., Ltd., and associated companies, and a director of the East Suffolk Electricity Distribution Co., prior to nationalisation, and a past president of the E.C.A., left £32,874 gross (£30,555 net value).

BRITISH STANDARDS

Colour Code for Twin Compensating Cables for Thermocouples. *B.S. 1843:1952. Price 1s.* This code provides for an indication of the nature of the thermocouple with which the compensating cable is intended to be used, and also the polarity of the individual conductor. These compensating cables are a pair of wires having such temperature—e.m.f. characteristics relative to the thermocouple with which the wires are intended to be used that, when properly connected to the thermocouple, the thermocouple reference junction is in effect extended to the other end of the wires.

Power Rating of Valve-driven High Frequency Induction Heating Equipment. *B.S. 1799:1952. Price 2s. 6d.* This new standard specifies the method of expressing the power rating of valve-driven high frequency induction heating equipment operating from single or polyphase mains supplies. The appendices explain the significance of output voltage and current in relation to power ratings and give examples of methods of output power measurement.

Until now no uniform practice has been observed in the power rating of high-frequency induction heating equipment, some manufacturers preferring to state the power taken from the supply mains while others give a figure for the output determined under arbitrary conditions. Users of this equipment need information on both input and output power and may, in addition, require some guidance on the voltage and current available at the output terminals. This standard has been prepared, therefore, to enable uniformity of practice to be achieved in the power rating of this type of high frequency heating equipment, and to give guidance and information on the subject.

Double-ended Open-jawed Spanners for B.A. Hexagon Sizes. *B.S. 1842:1952. Price 2s.* Details of the dimensions, proportions, manufacture and material of open-ended spanners of the spear-head and round-head types suitable for hexagon sizes in the B.A. range, such as those given in B.S. 57 "B.A. bolts, screws nuts and washers," are presented in this standard. The range and arrangement of jaw sizes are sufficient to cover normal requirements and the convenience of users. These spanners have a wide field of use in such industries as telecommunications, in which many hexagon bars and rods, as distinct from nuts and bolts, are used.

Enamel Round Copper Wire—Synthetic Resin (Vinyl Acetal Base) Enamel. *B.S. 1844:1952.* This is a further standard in the series relating to covered wires for winding coils for electrical apparatus. All sizes of wire from 0·002 in. to 0·160 in. diameter commonly in use are included.

Details of the enamel insulation are specified, together with elongation and continuity of covering, and methods of test given for the measurement of conductor diameter and overall diameter, hardness of enamel, electric strength, continuity of covering. There is a table of preferred sizes of conductor and the diameters of the covered wires.

Cooker Control Units for use in 2-wire Circuits of not more than 250 volts Declared Voltage. *B.S. 438:1952. Price 2s.* This revision applies to units suitable for the control of domestic electric cookers having a normal demand of approximately 30 amperes, such units consisting of a switch for controlling the current to the cooker, together with an auxiliary circuit for other apparatus. The cooker control units covered by this standard are not intended to work in an ambient temperature exceeding 50°C. without being derated. The principal differences between this revision and the 1941 edition of the standard are in Clauses 5 and 6, with the object of permitting the use of a shuttered socket-outlet and fused-plug in accordance with B.S. 1363, "Fused-plugs and shuttered socket-outlets." Amendments have also been made in Clauses 3 and 4 covering the requirements for the control switch and indicating device.

Extra-low Voltage and Low Voltage Ram Air-pressure Switches for Aircraft. *B.S. G.138:1952. Price 2s.* This specification states the requirements for a switch operated by the air pressure developed by the forward movement of aircraft, to meet the need for such switches owing to the development and use of equipment which must function or cease to function only when the aircraft is airborne or when the aircraft has reached a certain speed. This standard applies to switches operated by the ram air pressure produced by an aircraft in motion, and intended for use in nominal 24 V or 112 V d.c. systems.

Extra-low Voltage D.C. Flashing Unit for Aircraft Navigation Light Systems. *B.S. G.137:1952. Price 1s.* To meet the need for greater conspicuousness in aircraft navigation light signals, intensified by the increased speed and density of air traffic, the International Civil Aviation Organization has agreed that aircraft navigation lamps shall give an intermittent light. While this could be done in various ways, the unit covered by British Standard G.137 is an electrically operated device for alternately switching the lamp circuits to meet this requirement. Although designed to give the signals which the Air Registration Board requires aircraft in the United Kingdom to carry, the unit is adaptable to systems established by other national authorities within the I.C.A.O. agreement.

The standards reviewed above may be obtained from the British Standards Institution, Sales Branch, 24 Victoria Street, London S.W.1. post free at the prices stated.

The BUYER'S *Column*

The "Marvel" Switch returns

BACK on the market again is the famed Lundberg "Marvel" switch, now being made by SIMPLEX ELECTRIC CO., LTD., Broadwell, Oldbury, at their Sampson works.

This "Marvel" switch is a 3-position, 5-terminal switch for use mainly where restrictive and variable controls are required. A variety of switching arrangements is possible with the switch, one

3 positions giving a variety of switching arrangements are a feature of the Lundberg Marvel switch

example being an improvement on the usual two-way control for bedroom lighting.

Rated 1 amp at 250 V the switch has positive q.m.b. action. Constructed in white vitreous porcelain base with fixing centres $1\frac{11}{16}$ in., the "Marvel" can be surface pattern with brass dolly (and shockproof brown cover (19390 List No.), all insulated (17220), or flush pattern with top screw or side screw terminals with brass dolly (6461), or insulated dolly (6463).

Price Changes Announced

INCREASES in prices have been announced by the POWER CENTRE CO., LTD., Lloyd Street, Wednesbury, Staffs, and have been published in the form of a gummed sheet for fixing in the company's catalogue.

Cable trunking, on page 51 of List PRI, is subject to 10% advance, trunking fittings (pages 8-11) +115% advance, pin racks (p. 13) +145%, cable tap systems (p. 20) +60%, busbar chambers (p. 28) +60%, circuit clamps (p. 29) +145%, and sealing chambers (p. 30) +145%.

CHILTON ELECTRIC PRODUCTS LTD., Hungerford, Berkshire, have announced increases in the prices of their products. The Buk dryshaver now costs £5 19s. 8d. retail inclusive of tax, whilst the Kub model rises to £4 4s. also inc. tax. The transformer adaptor recently introduced with success by the company is now priced £1 6s. 6d.

Revised prices for the company's other products are tabulated as under. All take effect from April 1.

Atlas H.R.C. Miniature Circuit-Breakers

	£	s.	d.
Single pole	2	13	0
Double pole up to and including 30 amps ...	6	17	6
Double pole over 30 amps	7	9	10
Triple pole up to and including 30 amps ...	10	18	0
Triple pole over 30 amps	11	12	0
Extras for the above			
Bell ringing attachment		5	6
Earth leakage attachment (double and triple pole only)	1	7	3
No volt release attachment	1	10	6
Chilton Earth Leakage Circuit Breaker			
ELT/A up to 60 amps	1	19	9
ELT/B/30 with overload protection: 30 amp full load current	2	17	6
ELT/B/60 with overload protection: 60 amp full load current	3	9	6

The Drydenair Dinkie Radiator

LATEST addition to the "Drydenair" radiator range made by THOS. DRYDEN AND SONS, LTD., Grimshaw Street Foundry, Preston, is the "Dinkie," which as its name suggests is a neat, small-size economical radiator.

Constructed from cast iron and vitreous enamelled in eight standard colours, the "Dinkie" electric radiator is available in 250 W and 500 W loadings.

Although recommended for wall mounting six inches from floor level, the radiator can be supplied

The Dinkie doesn't need much room

with feet and with a chromium-plated towel rail, if so desired.

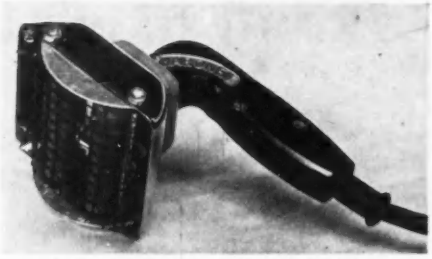
Dimensions of the "Dinkie" are 14 in. high by 16 in. wide by 3 in., and its weight approximately 28 lb. Prices are as follows: 250 W model with feet, £5 6s. and plus £3 18s. 3d. p. tax (for wall fixing this model costs £5 plus £3 13s. 6d.). The 500 W model is £5 5s. plus £3 17s. 2d. tax (with feet £5 11s. 6d. plus £4 1s. 11d.). The towel rail is priced £1 5s. plus 6s. 3d. purchase tax.

An Electric Paint Stripper

A MINIATURE electric fire is the principle of the electric paint stripper recently marketed by BARONET ELECTRICAL DEVELOPMENTS, 20 Regent Road, Harbowie, Birmingham 17.

Two small wound elements rated at 600 W are fitted in the body of the device to which an easy grip handle is fitted. Heat radiated from the elements and reflector softens and blisters the paint as with the normal blowlamp, and a hand scraper is then used to remove the paint.

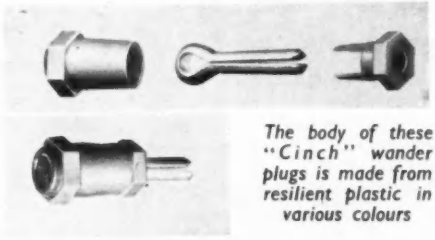
Fitted with 4 yds. of 23/36 3-core flex, the stripper is sold at 37s. 6d., tax free. It is guaranteed by the firm for one year.



This Baronet paint stripper is in effect a miniature electric fire

It's a "Cinch"

THE new "Cinch" wander plugs, made by the Carr Fastener Co., Ltd., and marketed by THE BENJAMIN ELECTRIC LTD., Brantwood Rd., Tottenham, N.17, who are the sole sales repre-



The body of these "Cinch" wander plugs is made from resilient plastic in various colours

sentatives, do indeed make for certain and quick connections.

These "Cinch" wander plugs comprise a resilient plastic body and sleeve with a plated metal split pin. They are designed for 4 mm. and $\frac{1}{8}$ in. diameter sockets and colours are red or black, with other colours to order.

Special feature of this new plug is its extreme simplicity in assembly—the flex is threaded and then twisted round the loop of the pin. The sleeve portion of the plug is then snapped on to the body, completing the assembly.

Additions to T.C C.'s range

A NEW range of electrolytic condensers has been introduced by the TELEGRAPH CONDENSER CO., LTD., Wales Farm Rd., North Acton, London W.3.

Principal feature of this new range is the ability to operate satisfactorily up to 85° C. on full working voltage. Leakage current is claimed to be low at room temperature with a minor increase as temperature rises.

The manufacturers assert that whereas the leakage current of the normal commercial electrolytic increases when idling over a long period, that of the 85° C. construction remains relatively constant.

Because of characteristic low leakage current and ability to work at high temperatures, these condensers are capable of handling much higher ripple currents for the same size of case.

The range, of etched foil construction, comprises components for capacities 8-100 μF at peak working voltages 450.

TRADE PUBLICATIONS

HYDRO-ELECTRIC PLANT.—"Discharge Regulators," is the subject of a booklet issued by the English Electric Co. Ltd., Queens House, Kingsway, W.C.2, which together with the new brochure on the Loch Sloy Power Scheme of the North of Scotland Hydro-Electric Board illustrates the extensive capacity of the company for the production of hydro-electric plant and equipment.

LIGHTING EQUIPMENT.—Now available from Alliance Wholesale Ltd., Croydon, London, Luton and Maidstone, and from Simpson, Baker and Co., Ltd., the associated company, is the new industrial and commercial lighting catalogue No. 495 which has just been issued.

BROADCAST RELAY.—Wired broadcasting, or "Rediffusion," to use the trade name of Broadcast Relay Services, Ltd., Carlton House, Lower Regent St., London, S.W.1, is explained in a new booklet just issued.

ELECTRICAL ACCESSORIES.—A coloured showcard is being distributed by the British General Mfg. Co. (1941) Ltd., 38 Glasshill St., London S.E.1, which illustrates the range of accessories, bells, etc., which the company produce. Also published this week is a handbill describing the Glow type FS2 and FS4 starter switches.

MECHANICAL HANDLING.—New booklet issued by Chloride Batteries Ltd., Clifton Junction, Manchester, makers of Exide Ironclad traction batteries, is an endorsement by the company of the lessons recently learned by the productivity teams that up-to-date handling methods speed output and lower costs in our factories.

PRICE MAINTENANCE discussed at E.L.F.A. LUNCH

THE question of price maintenance was referred to by Mr. K. Scott Adie, president of the Electric Light Fittings Association, at this year's annual luncheon which took place at the Piccadilly Hotel, London, on Wednesday of last week. It was the standardised items of lighting equipment which were covered by price schedules, he said, and it was only through these schedules that control of efficiency could be maintained.

Mr. Scott Adie said there was the closest possible technical liaison between members of E.L.F.A. and as a result they had built up their own ideals as to minimum standards of performance. There was also the keenest rivalry on a basis of quality and efficiency, which was as it should be, he added.

He reminded his audience that during the life of a fitting the cost of current expended could be many times the cost of the fitting itself. Efficiency, with a minimum of depreciation, should be the keynote.

The president went on to cite an example of what might happen without price maintenance. The price of super pure quality sheet aluminium most suitable for a specular reflector cost about 8s. 6d. per lb, whereas aluminium sheet of 99% purity sold at less than a third of that price. Its use offered an excellent opportunity for price cutting at the expense of efficiency.

Mr. Scott Adie was responding to the toast of "E.L.F.A." The toast was proposed by Sir Donald Matthews, who spoke of the important part trade associations played in replacing competition in price by competition in quality. The public owed a debt of gratitude to E.L.F.A., for lighting had achieved more in the drive for greater productivity than the man in the street realised.

Proposing the toast of "Our Guests," Mr. F. W. Norris spoke of the new spirit that had been created within the industry on the formation of the Association, which now covered nearly all manufacturers in the country. The reply was by Mr. J. Harwood Fryer. Mr. W. C. Huston toasted "The Past Presidents," to which Mr. A. E. Iliffe replied.

In his annual report, the president stated that despite material shortages and similar difficulties, the association continued to progress, even if the rate of progression had been retarded. Membership of E.L.F.A. at the close of 1951 comprised 47 manufacturers.

An Unusual Electric Oven

RHODESIAN Alloys Ltd. at Gwelo, S. Rhodesia, have recently accepted delivery of an interesting electric oven manufactured by G.W.B. Electric Furnaces Ltd. of Dudley. This unit is to dry electrode (Soderberg) paste prior to being formed into electrodes for alloy steel-melting furnaces. There are three compartments with four sets of runners, each to carry two charge pans. The depth of the oven is 5 ft 3 in., width between runner angles 1 ft. 6 in., and the height 5 ft. The total electrical rating of the oven is 36 kW, each compartment loaded at 12 kW in two 6-kW banks of nickel-chromium wire elements wound on refractory formers as shown in the photograph. These elements are arranged for easy removal.

The body of the oven is of double-cased sheet-steel construction, the space between the inner and outer sheets being packed with slab insulation. The central compartment is also separated from the other two by insulated panels. This, coupled with the fact that each chamber has its own insolator, switchgear and temperature indicating control thermostat, thereby makes independent operation possible.

The operating temperature ranges from 100° C. to a maximum of 220° C. and, as an added safety precaution, a second Teddington variable type thermostat is fitted in each compartment, acting as an excess temperature device to cut off the electric supply.

This illustration shows the heating elements with louvres removed

The WEEK in NEWS

L.E.B. Latest to Raise Tariffs

Now 1d. per unit—may be more to come!

INCREASED tariffs, with the threat of possibly more to come, have been announced by the London Electricity Board. The rise will operate after the meter readings following April 19. In many of the business and domestic two-part tariffs the fixed charges will be increased and standardised; and for both of those tariffs the running charge is raised from ¾d. to 1d. per unit. The flat rate for lighting will be increased to 5d. p.u., and for heating, cooking and small power to 1¾d. p.u. in all districts where the existing rates are below those figures. Proportionate adjustments will be made in certain block tariffs, and charges for many industrial supplies will also be increased. Those are the main alterations which are expected to produce £1,700,000 additional revenue. The Board points out that since tariffs were last adjusted in the London area, the Board has had to meet increased working costs amounting to over £2,000,000 a year, 54% of which is due to the rise in the cost of coal and 16% to higher wages and salaries. The balance is largely required to pay the capital charges on development work to meet the increasing demand for electricity in the area, and also to meet the higher B.E.A. bulk tariff charges, which have already been noted. Warning is given that if there be a further general advance in such costs there must inevitably be more increases in tariffs.

TRADE INVITED TO APPLY FOR EXPORT LICENCES

FOLLOWING the Board of Trade's withdrawal of Open General Licences for the import of numerous electrical commodities (see our March 20 issue,) the Board have now issued Notice to Importers No. 478, inviting applications for licences to import those goods. Quotas are to be established for the goods listed.

Importers are invited to apply on Form ILB/A (Revised) and these applications should be sent to the B.o.T's Import Licensing Branch, Romney House, Tufton St., S.W.1, arriving not later than April 17. A statement of total imports during 1951 should be enclosed.

The list of goods covered was given in our previous announcement but we note that the new procedure is to apply to refrigerators up to 12 cu ft capacity.

In their previous announcement the Board stated that no import licences would be issued for the items covered, but a further notice would be issued shortly. Broadly, the new regulations do not apply to the scheduled territories, Eastern Europe and the Americas though there are exceptions.

PROPOSED INCREASES IN TARIFFS SHOULD BE VETTED

RECENT increases in tariffs throughout the country have prompted a number of bodies to seek a supervisory committee to examine proposed increases in electricity charges. A resolution put forward at the Association of Municipal Corporations' annual meeting last week called for the formation of an electricity and gas appeal tribunal to approve all maximum tariffs and to hear appeals on tariffs and terms of supply.

A similar resolution has been proposed by Hastings Town Council, who, protesting against increased costs, urge a Ministry inquiry into rises before they become operative, and that the law be amended to require an official inquiry before future increases come into force. A suggestion that proposals for increases in tariffs should be made known to consumers before the Consultative Council considered them so that representations could be made, has, however, been rejected by the Midlands Council.

The First Half-Century

It is unfortunate that the Local Government Board should have adopted the policy of refusing loans for free wiring, as some corporations have already obtained such loans and have schemes in actual work. The writer, C. J. Sutherland, City Electrical Engineer of Worcester, believes he was the first to introduce the system of free wiring by a corporation, on the method that the work should be carried out by local contractors and paid for by the corporation.

A system on these lines was introduced by the writer at Hanley some five years ago, and the corporation was the first to obtain a loan of £1,000 for free wiring purposes. Unfortunately the system did not prove a success at the time, owing to the refusal of landlords to sign the necessary agreement that the wiring should remain the property of the corporation. The free wiring scheme now in use at Worcester was introduced by Mr. E. E. Hoadley in 1900.—*From our issue of April* 3, 1902.

Training Overseas Engineers

F.B.I. Mission leaves for Latin America

A BRITISH engineering training mission is to leave for Latin America on April 29 to make known the training facilities available to young engineers in those countries in the U.K. They will also discuss how the F.B.I. scholarships scheme can be adapted to the needs of local graduates, and make preliminary arrangements for the selection of suitable candidates. The countries to be visited are Mexico, Cuba, Venezuela, Columbia, Peru, Chile, Argentine, Uruguay and Brazil.

The mission, which travels under the auspices of the F.B.I. and has the full support of the Government, will consist of Sir Arthur Fleming, Mr. F. R. Livock and Mr. W. V. Jenkins.

The scholarships scheme was established three years ago and students may receive scholarships valued at nearly £1,000 each for a two-year course. They cover all branches of electrical, mechanical and civil engineering, as well as metallurgy.

While on the subject of overseas students learning about British industry, we note that 28 undergraduates and 10 graduates of engineering faculties in Canadian universities have been selected for the Athlone fellowships scheme. The cost of this scheme is borne by the British Government, and its object is to ensure that a representative body of Canadian engineers will have personal knowledge of our engineering capacity and the range of our manufacturers.

OFFICIAL PUBLICATIONS

BRITISH STANDARDS.
B.S.1799: *Power rating of valve-driven high-frequency induction heating equipment.* B.S.1842: *Double-ended open-jawed spanners for B.A. hexagon sizes.* B.S.1843: *Colour code for twin compensating cables for thermocouples.* B.S.1844: *Enamelled round copper wire (vinylacetal base).*

ELECTRICITY TRANSMISSION LINES *Transfer Orders relating to England and Wales*, H.M.S.O., 6d., S.I. 595; *and to Scotland*, H.M.S.O., 4d., S.I. 596. (*See page 645.*)

N. OF SCOTLAND HYDRO-ELECTRIC CONSTRUCTION SCHEME No. 65.
Bunanniog power station extension. (*See page 647.*)
Confirmation Order, H.M.S.O., 2d.; *Explanatory Memo*, H.M.S.O., 2d.

Committee on Radio Interference

THE Advisory Committee which is to consider requirements which might be prescribed in regulations dealing with interference with wireless telegraphy caused by small electric motors, has been appointed by the Postmaster-General. It comprises 21 members, including three women who have been selected from a panel nominated by the President of the I.E.E., with the approval of the Council. Chairman of the committee will be Mr. J. R. Beard.

The three women are Dame Caroline Haslett, Mrs. M. Courtney, and Mrs. C. Renton Taylor.

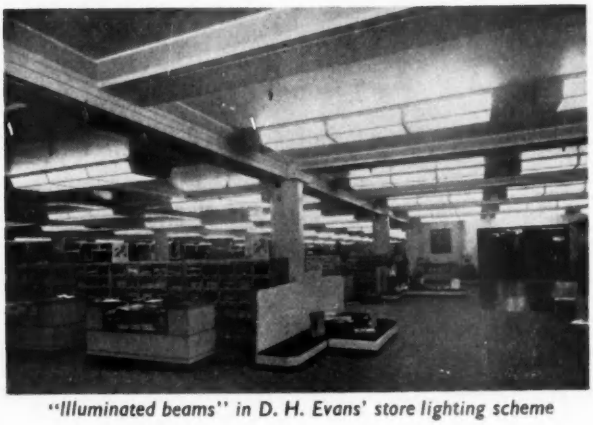
The remaining 17 male members are Messrs. L. Austin, A. H. Ball, J. I. Bernard, N. R. Bligh, J. S. Boyd, A. H. Cooper, W. J. Edwards, J. Flood, F. Gratwick, H. J. Manzoni, Maj. C. A. J. Martin, W. A. H. Parker, E. L. E. Pawley, G. F. Peirson, V. Robertson, W. A. Scarr, and Dr. S. Whitehead.

Lighting Units form New "Beams"

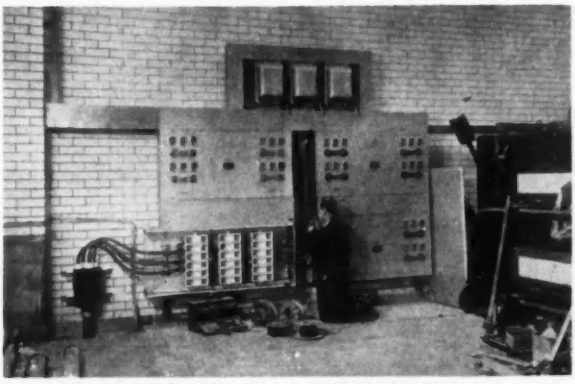
EXISTING beams on the third floor of D. H. Evans' West End (London) store have been supplemented by imitation "beams" formed by new lighting installation completed a short time ago by Drake and Gorham Ltd. The new scheme comprises 134 George Forest (Thorn Electrical Industries Ltd.) units housing cold cathode fluorescent lamps. Colour of the lamps is intermediate white.

Each unit measures some 10 ft by 17 in., metal work is stove enamelled in ivory finish and the glass panels are held by removable metal frames. Control gear is housed in the metal end caps. Safety caps have also been provided which disconnect supply to the h.t. transformers immediately those end caps are released. The wiring provides for two different circuits so that lighting may either be full or half intensity.

In the entrance to the showrooms two smaller units have been installed, while in the fashion theatre a similar unit, but measuring 44 ft in length, includes seven lamps in all, six being of intermediate white and one gold. This fitting is controlled on three circuits.



"Illuminated beams" in D. H. Evans' store lighting scheme



Control panels and switchgear in Nottingham bakery

Programme for 63rd Lighting Course

AS previously announced, E.L.M.A.'s 63rd Illumination Design Course will take place at the Lighting Service Bureau in London between April 21 and 24. The full programme has now been arranged and, despite the restriction to four days, the subject-matter has remained intact and complete. In general speakers will be kept to some 30 minutes and discussion will occupy the rest of each session.

Broadly the course may be divided into five parts. Fundamental principles will occupy the Monday morning, and the physical properties of light the remainder of the day. The sundry types of lamps and E.L.M.A.'s position will take up most of Tuesday, then the various applications of illumination in sundry circumstances will occupy the rest of the day, Wednesday and part of Thursday. Three talks on Design, one on "Built-in Lighting" and a final General Discussion complete the programme.

Early application for tickets is advised.

Telcon Staff Association Dinner

THE fourth annual dinner-dance of the Telcon Staff Association was held last week when over 300 members and guests had a most enjoyable evening.

Mr. R. C. Milner (research manager) proposed the health of "The Company" and referred to the pioneer work in the laying of the early Atlantic cable. He mentioned the staff as "having led the company into deep waters and by their efforts had kept it there."

Replying, Mr. J. N. Dean (managing director) said that the Staff Association created an important link between the staff and the management. The Board, he said, were proud of their child, and providing the child knew how to spend wisely, more money might be made available. Mr. W. F. Randall (director) proposed the "Staff Association" and Mr. W. R. Martin (personnel manager and chairman) responded.

EASTER RATES FOR WIREMEN

THE National Federated Electrical Association issue a reminder that operatives in the electrical contracting industry who are not required to work on paid holidays over the Easter period are entitled to a normal day's wages for the holidays in question. Those who work on any day which is a paid holiday in their "shop" area are entitled to pay at time and a half plus a day off in lieu, or, at the discretion of the employer, two and a half times the basic time rate, with no day off.

Electrical Equipment in Notts Bakery

BAKERIES are not premises which receive a great deal of attention in these columns, but it is felt that the control panels and switchboard installed at Turner and Sons' bakery in Nottingham should be recorded. Total electricity loading of the shop is 500 kW, of which 350 kW is accounted for by the five large ovens.

This load necessitated the installation of a 500 kVA E.M.E.B. substation and the use of 0·5 sq in. 3½-core paper-insulated cables to feed the oven control panels and general switchboard. All the main rubber-insulated cabling is carried in overhead steel trunking.

All the cable, which incidentally totals some 20,000 yd, and all the fluorescent lighting fittings used were supplied by Ediswan. The contractors were Attenborough and Turpin Ltd.

L.E.B. Coffee Week Demonstrations

IN 1652 Pasqua Rosee, servant of the London merchant who brought coffee here from Smyrna, set up the "Coffee Tent" in St. Michaels Alley, Cornhill.

This week, following the unveiling of a commemorative plaque at the site of the original "Coffee Tent," the Coffee Buyers Association is sponsoring a London Coffee Week to attempt to make Britons as "coffee conscious" as they were in the 17th century.

In association with E.D.A. and the Coffee Buyers Association the London Electricity Board is arranging a series of special demonstrations at their various service centres and showrooms on coffee making methods, and the uses of coffee in cookery.

Opening demonstration was arranged for the Press at the L.E.B. Regent Street Centre where Mrs. Marguerite Patton, of TV fame, demonstrated the art of coffee making. Mr. Victor Dale also introduced Mr. Arthur Gilbey, chairman of the Coffee Buyers Association.

ARRANGEMENTS FOR SPARE PARTS OF "XCEL" APPLIANCES

FOLLOWING the decision of Elexcel Ltd. to discontinue the manufacture of electric cookers and other domestic appliances, to which we first referred on May 24 last, the company has now made arrangements with Selex Electric Co., Ltd., Yardley Road, Kirby Trading Estate, near Liverpool, for the manufacture and supply of certain spare parts for "Xcel" cookers and other products previously made by Elexcel Ltd. Outstanding orders for such spares have been transferred to Selex Electric Co., who will make every effort to give prompt delivery. Any claims for free replacements of faulty parts under guarantee should also be sent to that concern.

BRITISH SHOPWINDOW IN ISTANBUL

AN exhibition of British goods, which is being organised by the British Chamber of Commerce of Turkey in Istanbul in the latter half of this month, should do much to further trade between the two countries. The example set in Turkey might well be followed by other British Chambers in non-sterling countries who have not hitherto arranged such a shop-window for our commodities.

The Istanbul show is to open on April 12 and close on April 29. Broadly, it has been divided into three sections, for textiles and lighter industries, vehicles and heavy industries, and agriculture. Judged from early bookings, the exhibition will be well patronized by British exporters, not least among them by any means being the electrical industry. Taking place just before our B.I.F., this may be termed a miniature British Industries Fair.

A quick perusal of exhibits shows a remarkably large proportion of electrical commodities. Domestic appliances are well to the fore, including stoves and heaters, refrigerators, washing machines, radio and TV sets, lighting fittings, telecommunication equipment and many others. Wires and cables, dry batteries and electrical measuring instruments will also be prominent, while in the heavier side, electric motors, diesel engines, welding sets and generators will be well represented.

This will be the first exhibition of its kind in Turkey's commercial capital, although the Istanbul Municipality has organised a local show in each of the past three years. British manufacturers have, of course, been well represented at the annual Izmir International Fair.

Lighting to Suit a Ceiling

AN example of a lighting installation which has been designed to fit in with the existing contours of a ceiling exists in the main research laboratory of the Yorkshire Copper Works. Eights rows of specially constructed cold cathode tube lighting have been arranged in continuous strips along the length of the ceiling. The resultant illumination provided is admirable for the close work done in the laboratory.

At the same time fluorescent lighting has also been fitted in all other departments and corridors of this laboratory. In the latter louvred fittings have been used and in offices fittings with translucent "Perspex" covers have been mounted on the walls as the ceiling is fitted with heating panels.

The scheme was carried out by Edmundsons Electric Co., Ltd., and designed by the British Thomson-Houston Co., Ltd., who also supplied the fittings.

Luncheon Talk on St. Bride's

A MOST interesting talk was given by the Rev. Cyril M. Armitage, M.V.O., to the Batti-Wallahs' Society last Wednesday. He chose as his subject St. Bride's Church, of which he is now vicar. This church, he said, was probably the oldest of the London churches, being built on a site originally occupied by a Roman temple.

The church had been badly damaged in the Great Fire of London, and in its rebuilding Wren had created one of the most wonderful architectural feats in the world. Damaged again in the blitz, it was now undergoing reconstruction, and as far as possible Wren's original ideas were being incorporated.

During site preparation, remains of the walls of three previous churches had been found and there were hopes of the discovery of the original Roman church.

Special Rate for Night Power Users?

THE question of a preferential tariff for consumers who use electricity at night only has been discussed by the East Midlands Consultative Council as foreshadowed in our issue of last week (page 600). It was stated there was already a special rate for industry, and for electrode boilers which were used for heat storage. The Board want to avoid opening the door for small users to come in *ad. lib.*, but there could be a special off-peak tariff. The Board were to consider the matter again.

It was reported that the Board had given an assurance that certain room definitions would be clarified when it was necessary to reprint the leaflet relating to that tariff. On the question of the new industrial tariff the Board has conceded that for consumers supplied directly from h.v. mains (under Tariff A), charges will not exceed those under Tariff C, provided they ensure that the power factor is maintained at not less than 0·85 lagging.

Judgment on River Derwent Case

RESERVED judgment was given on Monday against the British Electricity Authority (East Midland Division), British Celanese, Ltd., and Derby Corporation in the action in which damages were claimed for pollution of the River Derwent (which we reported on February 21). Mr. Justice Harman adjourned for further argument next Monday the question as to the amount and apportionment of damages to which the plaintiffs, the Pride of Derby and Derbyshire Angling Association and the Earl of Harrington, were entitled. In his judgment, His Lordship said it was admitted that at Raynesway Bridge, before receiving the effluents, the Derwent was clean. But below Borrowash Bridge it was black and foul, with little or no evidence of fish life. He did not doubt that solids put in by the Corporation substantially affected the state of the waters. The B.E.A.'s defence that their effluent was the inevitable result of authorised extensions could not be justified. The station could be run on a closed circuit or cooling towers used. The amount of chlorine and oxygen going into the river was insignificant compared with the harm done by heating it up, he maintained.

COLUMBUS-DIXON AMALGAMATION

THE hitherto associated companies, Columbus Ltd. and R. G. Dixon and Co. Ltd., have announced that they will form a single marketing organisation to be known as Columbus-Dixon Ltd. The change-over took effect as from April 1.

The two companies already hold a prominent position among manufacturers of medium- and heavy-duty floor maintenance equipment, and it is hoped the new arrangement will improve their position considerably. All resources and experience will, of course, be pooled, and the existing mobile technical advisory service expanded. There will be no change in the range of products made by both companies.

PLAQUE TO HONOUR SIR EDWARD MacCOLL

LORD COOPER, Lord Justice General, is to unveil a plaque to the memory of the late Sir Edward MacColl, a pioneer of Scottish hydro-electric development, at the Pitlochry Power Station shortly. Sir Edward MacColl was the Deputy Chairman and Chief Executive Officer of the North of Scotland Hydro-Electric Board from its inception in 1943 until his death in June 1951. He died on the eve of the official opening by Lady MacColl of the Board's Tummel-Garry Scheme. The plaque will be set up at the main door of the Pitlochry Power Station beside the fish pass on the River Tummel.

LINE OWNERSHIP TRANSFERRED TO C.A.

ORDERS covering the transfer of the ownerships of lines between the Central Authority and the various area boards were made by the Minister of Fuel and Power last week as Statutory Instruments 1952 Nos. 595 and 596, referring to England and Wales and to Scotland respectively. These orders broadly bring into effect the policy noted in the Second Report of the B.E.A., where it was recommended that 132 kV circuits should be owned, operated and controlled by the Central Authority, 33 kV and lower voltage lines by the area boards, and 66 kV lines by the Authority if used for power station interconnection, but otherwise by the boards. Certain substations are also affected by the orders.

NEWS IN BRIEF

Mr. G. L. Moss, president of E.P.E.A., was the guest of the association's Kent section at its 23rd annual dinner and dance recently.

The D.S.I.R. headquarters Technical Information Centre has been merged with the Technical Information and Documents Unit, at 15 Regent Street, S.W.1. (WHItehall 9788).

The S. Western Electricity Board's amateur dramatic society, "Faraday Players," have presented their third production, the comedy "The Mask and the Face," for five nights at the Board's Bristol showrooms.

The Food Advice Division of the Ministry of Food closes down on May 1. This means that all contact, direct and indirect, with the demonstrators and public, all demonstrations, features, courses, leaflets and publications will cease as from that date.

Sports and Social Club of Johnson and Phillips Ltd. has held its first sportsmen's dinner and smoking party for over 20 years. Footballers Sam Bartram, Charlton and England, and Jim Constantine, Millwall, were among those present.

Questions in Parliament . . .

Interference from Refrigerators

Mr. David Gammans stated in a written answer on Monday that the report of the Committee set up to advise on requirements for preventing refrigeration apparatus from causing interference with wireless telegraphy had been placed in the Library. He added that regulations were being considered.

Inquire into Nationalised Industries

Sir W. Smithers asked the President of the Board of Trade if the Monopolies and Restrictive Practices (Inquiry and Control) Act could be amended to empower the Monopolies Commission to inquire into the nationalised industries. The Minister stated he was considering the matter in preparing legislation to strengthen the Commission and widen the scope of their activities.

Owen Falls

Reporting on progress at Owen Falls, the Secretary of State for the Colonies said foundations for the first two generating sites were almost completed and walls of the power station were being built; 15,000 kW from the hydro-electric station should be available by September, 1953, and a further 45,000 kW by mid-1954.

Mr. Lyttleton was also asked whether it was a little undesirable that the ancillary schemes of flood reclamation and others should be subject to another department. They were dealing, he said, with geographical facts. No part of the Blue Nile flows through colonial territory, and it was unfortunate that inter-departmental boundaries are governed by geographical and not economic facts. He added that an exhibition of information would be arranged for Members.

Alternative to Alexandra Palace

The matter of the possible transference of TV broadcasting from Alexandra Palace to Crystal Palace was mentioned at question time last week. Mr. Gammans said a suitable site was being found if a move from Alexandra Palace became necessary. Alternatives were being examined.

Rateable Value of Private Generators

In a written answer last week Mr. R. A. Butler stated that where the value of premises was enhanced by the presence of an independent generator, the Inland Revenue were bound to include it when assessing the r.v. of premises. He said he was unable to alter the procedure.

B.E.A.'s Coal Stocks

Giving comparative figures regarding coal stocks, Mr. Geoffrey Lloyd has stated that 4,030,000 tons were held by electricity authorities on March 8 last as compared with 2,610,000 tons on March 10, 1951.

Fuel Economy Appliances

As a result of publicity by the Coal Utilisation Council and Women's Advisory Council on Solid Fuel, the demand for modern types of domestic stoves and grates exceeds the supply and no inducements to buy were necessary, stated Mr. G. Lloyd in a written answer. He had been asked whether in view of economy in fuel ensured by using modern appliances publicity could be given to the articles and for consideration of the offer of financial and other inducements for replacement of old appliances.

Advertising Electricity

Mr. Osborne asked last week if, in the interests of economy, expensive brochures advertising greater use of gas and electricity should cease while consumers are being asked to restrict the use of both services. Replying, the Minister of Fuel and Power stated the question was being reviewed and he hoped new principles would shortly be adopted and that purely promotional advertising would be discontinued.

Tax Allowance on Apparatus

Mr. G. Nabarro asked the Chancellor last week whether the cost to the Exchequer could be given in a full year of accepting as an admissible charge within maintenance allowances for Schedule A Income Tax, the cost of approved solid fuel burning domestic appliances. This would be based on 1951 rates of purchase for other than new houses and excluding council houses. Told by the Chancellor that this information was not available, Mr. Nabarro asked for clarification of the position. In some cases, he said, installation of the appliances was allowed as a charge against Schedule A and in others it was not. The matter, replied the Chancellor, would be investigated.

Factory Inspection in Wales

A further question has been asked concerning the inspection of Welsh factories. This queried the administrative changes of the Ministry of Labour concerning such inspection. Sir Walter Monckton stated that by altering certain boundaries there were now five districts comprising the whole of Wales and Monmouthshire. These had been grouped into an inspection division for Wales with its divisional offices in Cardiff.

Electricity in Outer Hebrides

The Secretary of State for Scotland told the House last week that work on electricity distribution in the Outer Hebrides was proceeding and would continue throughout the year in the western part of the island of Lewis and in an area between the west and Stornaway. Asked further whether this meant that no schemes were going forward in any of the outlying islands in the Hebrides, Mr. Stewart said the H.-E. Board had authorised an extension of distribution to Parish of Lochs and Tarbert. In addition, electricity would be taken to North and South Uist, although this scheme would probably not be started this year. Authority had also been received to build a diesel generating station at Doliburgh.

Electric Supply News . . .

Exeter

The local Chamber of Commerce has decided to ask the South Western Electricity Consultative Council to receive a deputation to put forward its views on the electricity tariff for commerce and industry which were put into operation recently. One member suggested that they should bring to the notice of the Electricity Board the heavy increases which had to be borne by industry under the new tariffs, and to tell the Board of the burden which industrial consumers in the south-west had to bear to pay for supplying a rural area.

Falkirk

The dispute between the town council and the South East Scotland Electricity Board concerning the cost of providing a supply to the Langlees housing estate, to which we referred on February 14, came before the area consultative council last week. After hearing deputations from the T.C. the consultative council decided to recommend to the board that the latter should charge at the basic rate of £10 for each of 36 underground service connections to the 72 houses on the site, amounting to £360. This anticipates charges which will be made from April 1 in the board's area for the provision of new service connections. The T.C. wished to be charged at the rate of 10s. per yard of underground cable, formerly charged in the Falkirk area, which would amount to £307 10s. It was stated that the board, which had made various offers which had been refused, now felt obliged to enforce the statutory charges, probably amounting to £636 7s. It will be recalled that the T.C. won its point on the use of underground cable instead of o.h. lines as proposed by the board, on appeal to the Ministry of Fuel and Power, and has since objected to being asked to pay for the increased cost of materials since the application for a supply was originally made.

Islay

A scheme for the construction of an extension to the existing diesel generating station at Bunanuisg, near Bowmore on the Isle of Islay, is announced by the North of Scotland Hydro-Electric Board. A further 2,400 kW of plant is to be installed, at a cost of £88,000, to bring the station's total capacity to about 3,000 kW. The scheme has been approved by the Rt. Hon. James Stuart, Secretary of State for Scotland.

Isle of Man

Over 32 million units have been generated at its Peel diesel power station, which has been running since June, the Isle of Man Electricity Board has disclosed. The station was constructed in ten months at less than the estimated cost, and running costs have proved most satisfactory in spite of increased fuel costs, fully justifying the decision to install further plant in the near future, it is stated. Maximum load has been 27% above the estimated figure, and steps are being taken to meet still higher loads in the coming years. During the past two years, consumers have increased by some 20% to a total of nearly 9,100, and the units sold during the past year approaches 17 millions. Good progress has been made on the farm extension system; the first scheme was completed early last year and the Board is more than halfway through the second part of the scheme covering a further 200 farms.

Langdale Valley

The Lakeland Planning Board was recommended to permit the erection of o.h. lines, suitably sited, to Langdale and Hartsop, near Patterdale, by the Lakes Urban Council at its meeting last Thursday, when it was suggested that too much emphasis by Lakeland planners on the question of amenity was mainly responsible for the long delay in providing electricity for the Langdale Valley. A letter from the North Western Electricity Board indicated that two years ago the Board were anxious to proceed with an overhead scheme to supply Langdale, with lines running through parts of Lancashire and Westmorland. The Board obtained consent from the former, but was held up by the latter, and while awaiting their approval serious difficulties arose with regard to capital schemes. The Board then had to withdraw application for permission to erect the lines. To place lines underground in Lakeland would cost three times as much as o.h. lines, it was stated.

South Wales

The non-statutory undertaking previously supplying the village of Llangadock has been taken over by the South Wales Electricity Board with effect from April 1.

LIGHTING SCHEMES

Aberdeen.—T.C. is recommended to install decorative lighting in Union Terrace Gardens and at the beach.

Aldershot.—T.C. has approved the provision of sodium lighting at Church Lane East, at an estimated cost of £2,000.

Aldershot.—T.C. has approved a £2,000 scheme for sodium lighting in Church Lane East

Filey.—T.C. has approved scheme for conversion of street lighting to electricity, involving 294 lamps at a cost of £12,000.

Lymington (Hants).—The borough council is considering a proposal to convert street lighting to electricity.

Old Kilpatrick.—The district council has approved a £7,000 scheme to electrify lighting in the main Old Kilpatrick-Bowling Road. The plan awaits approval of Dumbartonshire C.C.

Walton and Weybridge.—A scheme for improved lighting in Terrace Road, Walton, at a cost of £2,673, is awaiting M.o.T. approval.

Company Activities . . .

Thomas Bolton and Sons

Current assets are listed at £3,477,324 (*£3,173,671*) in the full report and accounts. Of this sum stocks and work in progress amounts to £2,330,361 (*£2,203,937*), and debtors total £1,109,969 (*£942,637*). Current liabilities aggregate £1,802,187 (*£1,678,137*), including creditors of £1,532,660 (*£1,387,341*). Capital expenditure commitments outstanding total £70,000 (*£90,000*). Commenting on the cash bonus of 2½% (*nil*) with the 10% (*same*) dividend, the chairman, Mr. P. V. Hunter, gives warning that there is not in the director's mind any suggestion that this action will set a precedent for the future.

A. C. Cossor Ltd.

The directors announce that payment of the outstanding arrears of dividend on the 6% Preference stock, together with the dividend for the year ending March 31, 1952, totalling two year's dividends, will be paid on April 28. The last Ordinary distribution was 25% plus a tax free capital repayment of 7% for the year ended March 31, 1947.

English Electric Co. Ltd.

The most outstanding units in the steam turbine field supplied by the company in 1951 were the hydrogen-cooled machines for the B.E.A. at Fulham, Birkenhead and Stourport, and the first of four machines for the Clark Keith station, Windsor, Ontario. During the year an order had been received for a water turbine driven alternator for Canada rated at 106,000 kVA at 327 r.p.m., with a greater output than had ever previously been incorporated in a single unit at that speed. The switchgear branch had been very active, on a 275 kV, 7,500 MVA breaker—the first complete service switch of that voltage to be so tested in this country—was fully tested to the satisfaction of the B.E.A., and an order for these c.bs. had been received from them. Referring to the Excess Profits Levy, Sir George Nelson said it appeared that more than two-thirds of the company's gross profits were to be taken in taxation. That was clearly not a proportion which was consistent with the need to keep abreast of the great technical developments in the industry, which were vital to the future prosperity of this country.

At a subsequent extraordinary general meeting, shareholders approved a proposal to increase the authorised capital to £10 million by the creation of a further two million Ordinary shares of £1 each.

Alfred Herbert Ltd.

Consolidated trading profit for the year ended October 31 last amounts to £2,302,535, which is £611,910 more than for the previous period. After providing £40,776 (*£962*) provision for diminution in value of stock and work in progress, £37,424 (*£10,992*) book debts reserve, £10,000 (*£150*), written-off investments, £5,797 (*£3,436*), expenses of subsidiary's capital increase, and taxation of £1,263,513 (*£794,456*), the net profit is £995,178 (*£921,493*), of which £22,897 (*£33,588*) relates to outside shareholders, leaving a balance of £972,281 (*£887,905*). Add tax and depreciation overcharged £204,468 (*nil*), and with £3,104,530 (*£2,472,882*) brought in there is £4,281,279 (*£3,360,787*) available. Dividends take £160,405 (*£130,475*) and there is £4,120,874 carried forward.

Hoffmann Manufacturing Co.

For 1951 the group net profit, after providing £617,669 (*£525,101*) for taxation, amounts to £470,668 compared with £382,297 for the previous year. The sum of £117,495 (*£83,128*) is retained in subsidiaries, leaving a net profit of the parent company of £353,173 (*£299,169*). The Ordinary dividend is increased from 10% to 12½%, tax free. The sum of £20,000 (*£10,000*) is transferred to the benevolent fund, £50,000 (*same*) to stock reserve, and £200,000 (*£160,000*) to fixed asset replacement reserve, leaving £173,905 (*£177,553*) carried forward.

Metropolitan Electric Cable and Construction Co.

For 1951, the net profit, after charging taxation of £33,796 (*£25,850*), is £43,181, compared with £23,933 for the previous year. The final dividend is 15% (*5%*), making 25% (*15%*) for the year. The sum of £13,000 (*nil*) has been paid as compensation to a director for loss of managerial post.

Phoenix Telephone and Electric Holdings

Approval was given at last week's meeting to the increase of capital to £461,695 by the creation of 200,000 additional 5s. Ordinary shares. Approximately 190,000 of these new shares are being issued pro rata to the Ordinary shareholders on the basis of 19 shares at 5s. 3d. each for every 60 held.

Telephone and General Trust

Group profit for 1951, after all charges, including taxation, is £148,806 (*£156,475*). The final Ordinary dividend is 5%, again making 8% for the year. There is also a dividend of 8% on the "A" Ordinary. U.K. and Colonial tax charged is £97,107 (*£106,512*). Hurricane damage expenditure—proportion written off £13,200 (*nil*). Attributable to members of holding company after deduction of outside interests £117,785 (*£129,400*). Profit of the holding company for the year (subject to income tax) is £163,939 (*£160,437*), and after transferring £10,000 (*same*) to revenue reserve and £25,000 (*same*) to contingencies reserve, there is £100,345 (*£98,752*) carried forward.

Dividends Declared

Peter Brotherhood.—Interim dividend of 12% (8%).

Joseph Lucas (Industries).—Interim of 1½% (*same*).

Commercial Information

CONTRACTS OPEN

HOME

April 4.—Midlothian. Electrical work in erection of four houses at Carrington. County Architect, 32 Palmerston Place, Edinburgh.

April 5.—Blackpool T.C. Supply of tower wagon complete with body and chassis. Illuminations and Street Lighting Officer, Electrical Services Dept., Rigby Rd. East. (See March 27 issue.)

April 5.—Chadderton U.D.C. Supply of electric lamps required for year ending Mar. 31, 1953. Engineer and Surveyor, Town Hall.

April 5.—Knaresborough U.D.C. Electrical installation in 62 houses on Meadowside estate. Engineer and Surveyor, Knaresborough House.

April 7.—Antrim. Electrical installation in 18 houses at Whitehead for N. Ireland Housing Trust, 12 Hope St., Belfast. Deposit 10s.

April 7.—Bo'ness T.C. Electrical work in (*a*) 4 shops and 2 houses, (*b*) 38 houses at Maidenpark and 8 houses at Grangepans. Applications by above date to A. Stewart Jamieson, Town Clerk, Burgh Chambers.

April 7.—Bradford. Electrical installation to 18 houses at Buttershaw. City Engineer and Surveyor, Town Hall. Deposit £2 2s.

April 7.—Merton and Morden U.D.C. Erection of concrete columns, steel brackets, and provision of mercury vapour and fluorescent lanterns, control gear and wiring for street lighting. Engineer and Surveyor, Morden Hall, S.W.19.

April 7.—Newmarket U.D.C. Wiring of 128 houses in Exning Rd. Architect is P. D. Lees, Council Offices, Severels House. Deposit £1 1s.

April 7.—Romford T.C. Electrical installation in 100 dwellings on Fuller's Farm and Hillfoot Rd. estates. Borough Engineer and Surveyor, Town Hall. Deposit £2 2s.

April 7.—Southport T.C. Installation of Class "B" lighting on Heathfield Rd. site. Lighting Engineer, 117-123a Shakespeare Street.

April 7.—Tonbridge (Kent) R.D.C. Wiring of 28 houses and flats. Engineer and Surveyor, 48 Pembury Road.

April 7.—West Riding. Renewal of electrical installation (phase 2), at Keighley Technical College and grammar school. County Architect, "Bishopgarth," Westfield Rd., Wakefield. Deposit £2 2s. (See March 20 issue.)

April 7.—West Riding. Electrical contractors wanting to tender for lighting, heating and power installations for C.C. should make application for names to be included in lists of selected contractors. County Architect, "Bishopgarth," Westfield Rd., Wakefield. (See March 13 issue.)

April 8.—Bristol. Supply of cables and steel conduit tubes and fittings for year beginning May 1. Central Purchasing Dept., 2 Upper York St., St. Paul's, Bristol.

April 8.—Dornoch T.C. Electrical work in erection of four blocks of houses. Burgh Surveyor, Carnegie Library Building, High Street.

April 8.—Dublin. Electrical installation at Employment Exchange, Victoria St., for Commissioners of Public Works. J. Tyrrell, secretary, Office of Public Works. Deposit £1.

April 9.—Forres T.C. Electrical work in connection with fourth development at Anderson Cres. Applications by above date to Rowand, Anderson, Kininmouth and Paul, 107 High St.

April 9.—Manchester. Supply of flat twin vulcanised rubber insulated 250 V grade cable for street lighting during period ending Dec. 31, 1952. Documents from City Surveyor, Town Hall.

April 9.—Stoke-on-Trent. Supply of necessary electrical installation, including cables, switchgear, etc., for construction of Blithe Valley sewerage scheme. City Sewage Engineer, Leek Road. Deposit £5. (See March 13 issue.)

April 9.—Sunderland T.C. Electrical installation in hostel for aged at Thorney Close. Borough Architect, Grange House, Stockton Rd. Deposit £2 2s.

April 10.—Belfast. Supply of (*a*) one 200 kVA static transformer, 3-phase/2-phase, 6,500 V/230V, and (*b*) rubber covered conveyor belting. Electricity Dept., East Bridge St., Belfast. (See March 20 issue.)

April 11.—West Lothian. Electrical work in erection of 32 houses at Dalmeny, 42 at Uphall and 16 at Livingston Village. Applications by above date to John Calder, County Clerk, County Buildings, Linlithgow.

April 12.—Aberdeen. Electrical work at Turriff Academy. Documents from James Munro, architect, Deveron Rd., Turriff.

April 12.—Belfast. Modifications and additions to electrical installation at Royal Belfast Hospital for Sick Children. Consulting Engineers are F. W. Parkinson and Partners, 6 Murray St. Deposit £3 3s.

April 14.—Wakefield. Supply and erection of twenty-one 25-ft. concrete columns mounting mercury vapour lanterns for street lighting in Barnsley Rd. City Engineer, Town Hall.

April 15.—Belfast. Supply and erection of earth leakage trip switches, earth electrodes and wiring in 185 houses and 10 flats on Mount Vernon estate. Education Architect, Academy Street.

April 15.—Seaton Valley (Northumb) U.D.C. Supply of electrical goods for 156 houses to be built this year. Surveyor, Council Offices, Seaton Delaval.

April 16.—Newtownards (Down) R.D.C. Electrical installation in erection of 84 houses at Comber. Surveyor, 2 Glenford Place. Deposit £2 2s.

April 16.—Sedgley U.D.C. Proposed street lighting scheme on Ettymore (North) estate includes provision and erection of 33 columns, 60 W tungsten filament and 80 W mercury vapour lighting equipment. W. M. Jones, Engineer and Surveyor, The Limes, Dudley Road.

April 17.—Belfast. Installation of electric lighting in gymnasium at Graymount intermediate school. Education Architect, Academy Street.

April 18.—Edinburgh. Electrical installation in reconstruction work at 82-84 Canongate. City Architect, City Chambers.

April 18.—Manchester. Supply of electric machines and machine tools for metal work and woodwork rooms at St. Columba's R.C. school. City Architect, Town Hall. Deposit £1 1s.

April 19.—Swansea T.C. Electrical installation at West Penlan primary school. Applications by above date to Borough Architect, The Guildhall. Deposit £2. (Advertised in this issue.)

April 23.—Co. Down. Electrical installation at Kilkeel primary school. Architect, D. W. Boyd, 43 Scottish Provident Buildings, Wellington Place, Belfast. Deposit £5 5s.

April 25.—Belfast. Supply and erection of (*a*) road transport weighbridge (30 tons), tender No. N.1054; and (*b*) two sets of condensate chemical treatment plant for turbo-alternators, tender No. N.1174. Merz and McLellan, consulting engineers, Carliol House, Newcastle-on-Tyne 1. Deposit £5 5s. in each case. (See March 27 issue.)

May 1.—Lincoln. Electrical installation in erection of new infants' school at Grantham. Applications by April 7 to J. W. H. Barnes, County Architect, County Offices, Sleaford.

No date stated.—Inverness. Supply of electric lamps for year beginning April 1. Applications to E. W. M. Watt, secretary and treasurer, Board of Management for Inverness Hospitals, Muirfield Hospital.

No date stated.—N. of England. George Wimpey and Co., Ltd., invite applications from firms desirous of being placed on list for sub-contract work in Lancs, Yorks and Cheshire. Inquiries to company at 629 Eccles New Rd., Salford 5.

No date stated.—N. of Scotland H.-E. Board. Supply and erection of 132 kV double circuit steel-tower overhead lines (about 21 miles), between Rothienorman and Strichen. Same for 26 miles route between Fort Augustus and Glen Truim. These are separate contracts. Merz and McLellan, 39 Northumberland St., Edinburgh. Deposit £2 2s. (Both were advertised in our March 13 issue.)

OVERSEAS

*Details of items marked * may be obtained on application to Room 1076, Board of Trade, Horseguards Avenue, S.W.1, quoting reference.*

April 16.—Australia. Supply of 2 million V impulse generator with voltage divider and necessary components, one d.c. charging unit with voltage measuring equipment, one control table and spares. Plant suitable for 230/400 V 50 c/s 3-phase, four-wire supply. State Electricity Commission of Victoria, 22-32 William St., Melbourne. B.o.T. (Ref. CRE 11893/52).*

April 24.—Tangier. Supply and installation of street lighting by fluorescent lamps in Avenue d'Espagne, Tangier. Ingénieur Directeur de la Régie des Services de l'Eau et de l'Electricité, 4 Rue Vermeer de Delft, Tangier. B.o.T. (Ref. CRE 9900/52).*

April 25.—Belgian Congo. Supply of domestic lighting units and electrical equipment for Kamina Base. Service des Approvisionnements du Ministère des Colonies, 14 rue de Petits Carmes, Brussels. B.o.T. (Ref. CRE 11778/52).*

April 28.—Nairobi. Supply and erection of two 30 kW hydroturbine generators and a 35 kW Diesel generator, with switchgear and cabling. Consulting Engineers, Howard Humphreys and Sons, Victoria Station Hse., Victoria St., London S.W.1. Deposit £3.

April 29.—Uruguay. Usinas Electricas y Telefonos del Estado invites tenders for supply of telephone equipment with local battery and accessories. B.o.T. (Ref. CRE 8623/52).*

CONTRACTS PLACED

B.E.A. One 60,000 kW turbo-generator set, feed heating and condensing plant, Littlebrook "C", and two 30,000 kW turbo-generator sets, feed heating and condensing plants, at Connah's Quay, C. A. Parsons and Co., Ltd.; two generator transformers, Doncaster, General Electric Co., Ltd.; 275 kV 7,500 MVA switchgear and 132 kV 3,500 MVA switchgear, at Elstree, A. Reyrolle and Co., Ltd : and 132 kV double circuit overhead line from Little Barford to Fulbourne, British Insulated Callender's Construction Co., Ltd.

Newcastle-on-Tyne. Installation of electricity at new workshops of Rutherford College of Technology, Robson and Coleman Ltd., £6,950.

Tynemouth T.C. Supply of electrically driven pumping machinery for second stage of Wansbeck station scheme, Sulzer Bros., £10,285.

Your Queries — Answered

"Mitre" towel rails, makers of? E.B.—Albany Sheet Metal and Eng. Co. (Oldham) Ltd., Albany Mills, Vulcan St., Oldham. (22569)

"Dugdill" adjustable fittings, makers of? F.E.—John Dugdill and Co., Ltd., Hazel Grove, near Stockport. (22576)

"H.T.A." switches, makers of? E.B.—Hall Telephone Accessories Ltd., Dudden Hill Lane, N.W.10. (22582)

"Gem" water heaters, makers of? L.E.—Gem Water Heater and General Component Co. Ltd., 36 Station Rd., Westcliff-on-Sea, and are distributed by Poselco Ltd., 39-40 Lancaster Mews, W.2. (22587)

"Fluoradisc" circular fittings, suppliers of? T.S.—Drubel Distributors Ltd., 39a Stafford Rd., Croydon. (22598)

Magnetised letter type signs, suppliers of? W.C.—"Wondersigns," 77 Borough Rd., S.E.1; Chase Products (Eng.) Ltd., 27 Packington Rd., W.3. (22604)

The above are selected from questions we have answered this week. If you have a query, send it to us.

ANSWER WANTED

"Newheat" greenhouse heaters, makers of? N.E. (22613)

NEW COMPANIES

Extracted from the Register issued by Jordan and Sons, Ltd., 116 Chancery Lane, London W.C.2.

Ladypool Precision Ltd., 27 Stratford St., Birmingham, 11. General, precision, mechanical, motor, aeronautical, electrical and constructional engineers, etc. Nom. cap.: £100. Dirs.: J. H. Brewer, F. F. Dodson, S. H. Fell and C. D. Headland.

Livingston Laboratories Ltd., 37 Norfolk St., W.C.2. Electronic and electrical manufacturers, etc. Cap.: £10,000. Dir.: F. L. Hogg.

Lodge Plugs (Northern Ireland) Ltd., 78-80 Cornhill, E.C.3. Manufacturers of and dealers in sparking plugs, electrical appliances, etc. Cap.: £10,000. Dirs.: not named. Subs.: G. T. Sammons and A. L. Leddiman.

Magimix Sales, Ltd., 1 Drapers Gdns., Throgmorton Ave., E.C.2. To take over business of sole selling agents of all goods manufactured or dealt in by E. J. Bowman (London) Ltd., the manufacturers of the "Magimix Mixing Machines," and to carry on business of chemical and electrical engineers, etc. Nom. cap.: £25,000. Dirs.: Not named. Subs.: D. J. Crawford and Henrietta Chisholm.

N.S.R. Hirings Ltd., 394 Northolt Rd., South Harrow, Middlesex. Electrical and general engineers and contractors, etc. Cap.: £1,000. Dirs.: A. J. Walker and A. G. M. Walker.

N.S.R. Manufacturing Ltd., 394 Northolt Rd., South Harrow, Middlesex. Manufacturers of and dealers in public address equipment, wireless, television, etc. Cap.: £1,000. Dirs.: A. J. Walker and A. G. M. Walker.

Phillips and Bonson Ltd., Imperial House, Dominion St., E.C.2. Manufacturing electronic engineers, etc. Nom. cap.: £2,500. Dirs.: F. M. Phillips and L. E. Bonson.

H. L. Prior and Co. Ltd., 23 Northgate St., Great Yarmouth. Electricians, mechanical engineers, etc. Cap.: £1,000. Dirs.: H. L. Prior and Mrs. A. E. Prior.

Rebus Electric Ltd., Bank Chmbrs., 2 Putney Hill, S.W.15. Manufacturers of and dealers in radio sets, etc. Cap.: £2,000. Dirs.: C. O. L. Ward and Mrs. G. M. Ward.

PRICES OF CABLE METALS AND OTHER MATERIALS
(at Tuesday night)

	£ s. d.	New York price
COPPER, electrolytic	231 0 0	£220 0 0
LEAD, good soft pig (foreign)	163 0 0	152 0 0
" "English" quality ...	164 10 0	
Tin (99.99.75%) ... ...(Cash)	960-962	—
" (3 months)	963-965½	—
ALUMINIUM, commercial purity (del.)	154 0 0	—
ZINC	190 0 0	156 0 0
ARMOURING:		
Galv. Steel Wire (0·104 in.) ..	59 10 0	—
Mild Steel Tape (0·04 in.)	39 15 0	—

GAZETTE ANNOUNCEMENTS

COMPANIES ACTS

British Astral Co. Ltd. Creditors are asked to send particulars to P. W. Hort, liquidator, 28 Baldwin St., Bristol, by April 18.

Kettlewell Electricity Supply Co. Ltd. Resolution for voluntary winding-up passed at meeting on Mar. 12, when Ernest Van Ham, The Oval, Tranmere Park, Guiseley, Leeds, was appointed liquidator.

Llansilin Electricity Co. Ltd. Meeting of members will take place at The Cross, Oswestry, on May 3 at 3 p.m., to receive liquidator's report.

Eaton Canadian Products (England) Ltd. Creditors are asked to send particulars to liquidator, H. J. Jones, 251 Dashwood Hse., Old Broad St., E.C.2, by April 21.

C. Linnell and Sons Ltd. Resolution for winding-up passed at meeting on Mar. 21 when Percy J. Snow of 17 Albion St., Hanley, was appointed liquidator.

Voluntary Liquidation

Harris and Stacey Ltd., radio and electrical engineers of Leicester. At statutory meeting of creditors, statement of affairs showed liabilities of £2,712, of which £1,941 was due to trade creditors, and £770 to cash creditors. Assets estimated to realise £2,034 and after providing for preferential claims of £134, there were net assets of £1,899 or deficiency, subject to costs of realisation, of £812 so far as the creditors were concerned. Issued share capital was £1,500 and as regarded shareholders there was a total deficiency of £2,312. Resolution passed confirming voluntary liquidation with R. A. Haigh, C.A., of A. C. Palmer and Co., Ct. Chmbrs., Friar Lane, Leicester, as liquidator with committee of inspection.

BANKRUPTCY ACTS

Order on Application for Discharge

Ashley Light Industries Ltd. Henry Meredith, Official Receiver, 16 Westwood Rd., Southampton, has been appointed liquidator.

Ashton-under-Lyne. Stanley F. Bent, electrician trading as S. F. Bent and Sons at 362 Ashton New Rd., Bradford, Manchester. Discharge suspended for two weeks and that it take effect from Mar. 12. Grounds are refusal of absolute order of discharge.

London. Royal Ernest Stebbings, refrigeration engineer trading as Millman Refrigeration Service at 87 Guildford St., W.C.1. Bankrupt's discharge suspended for 2½ years from Nov. 2, 1951. Grounds named: refusal of absolute order of discharge.

Salford. Wilfrid E. Lawton, dealer in refrigeration equipment, trading as Lawton Bros. at 36 Lower Broughton Rd., Salford. Bankrupt's discharge suspended for one month and that he be discharged as from Mar. 25. Grounds named, for refusing absolute order of discharge.

TRADE MARKS

This information is extracted from the Official Journal by permission of the Controller.

Beresford Corona, 691,312 Class 7. Centrifugal and submersible electrically-driven pumps; sump pumps for draining cellars, suds pumps, etc. James Beresford and Son Ltd., Kitts Green Works, Mackadown Lane, Marston Green, Birmingham.

Capinvar. 690,592. Class 9. Electrical apparatus and instruments, etc. 690,593. Class 17. And **Compencer.** 690,591. Class 17. Insulating material, insulators, etc. Compagnie Generale d'Electro-Ceramique, 12, rue de la Baume, Paris 16, France.

BUSINESS PROSPECTS

HOME

Abergavenny T.C. Erection approved of a total of 32 dwellings on Llwynn estate.

Barry T.C. Approval being sought for construction of 172 houses on Port Rd. site and 25 dwellings on Buttrills Rd. site.

Bedwas and Machen U.D.C. Erection of 49 houses on Chatham site. Council's Architect, J. H. Thraves, 63 High St., Newport, Mon.

Billingham-on-Tees U.D.C. Smith and Coates Ltd. planning erection of light industrial premises. Plans approved for alterations and additions to I.C.I. Ltd's works.

Boldon U.D.C. Construction of 38 houses in district. Surveyor is J. T. Edmondson.

Brentford and Chiswick T.C. Erection of eight shops and 14 maisonettes in High St., Brentford. Borough Engineer and Surveyor, Town Hall, Chiswick, W.4.

Brighton T.C. Refreshment and tea bars are to be built on the race-course and a number of electrical fittings are required. Communications to Town Clerk.

Cheadle (Staffs). Combined fire and ambulance station to be built.

Cheltenham T.C. Tenders likely to be invited soon for construction of 120 flats in Hester's Way.

Clay Cross (Derby) U.D.C. It is proposed to build 120 houses for miners.

Clogher (Tyrone) R.D.C. Application to be made for sanction to borrow £31,000 for construction of 30 houses.

Consett (Dur.) U.D.C. Council is planning to erect 98 houses at Leadgate and 60 at Moorside.

Coventry. Birmingham Regional Hospital Board recommended to approve rewiring of wards and kitchen at High View Hospital. Estimated cost of project is £1,330.

Crawley. Development Corporation is to build 121 houses at Northgate, 478 at Three Bridges and 696 at Langley Green.

Droylesden U.D.C. Construction of 50 flats off Moorside St. F. Bradley, architect, Penny Bank Chambers, 4 Wood St. Bolton.

Dublin. Plans approved for 87 houses in St. Anne's area, 470 in Rathfarnham and 112 flats in Thorncastle St. area. Also erection of boys' school in Synge St. for Irish Christian Brothers. Quantity surveyors are Morris and Kavanagh, 68 Harcourt St. Erection of 164 houses on Finglas East site, City Treasurer, Exchange Buildings, Lord Edward St.

East Kilbride. Development Corporation has approved erection of some 130 houses.

Faversham T.C. Erection of 32 flats on North Preston site. Borough Surveyor, Municipal Offices.

Glasgow. Dean of Guild Court has approved plans for erection of six small schools. Also the erection of 116 flats on three sites at cost of £139,200. Council is also to build 156 houses at Townhead.

Greenwich B.C. Erection of block of flats in Elliscombe Rd. Borough Engineer and Surveyor, Town Hall, Greenwich High Rd., S.E.10.

Ipswich. Chantry county school has been included in 1952-3 building programme.

Islington B.C. Scheme estimated to cost £1,503,600 has been approved providing for 517 flats, 62 maisonettes and 32 flats at Highbury Quadrant, overlooking Clissold Park.

Leeds. Erection of 240 houses on various estates. City Architect, Priestley House, Quarry Hill, Leeds 9.

Norwich. Erection of 172 dwellings on North Park Ave. estate. City Architect, City Hall.

Portsmouth. Erection of 146 houses at Leigh Park. City Architect, Municipal Offices, 1 Western Parade.

Southampton. Transport Commission is to build passenger and cargo terminal at New Docks at cost of £900,000.

Stroud U.D.C. Construction of 30 houses at Cashes Green. F. Foster Langley, Engineer and Surveyor, Council Chambers, High St.

Whitby U.D.C. Erection of 106 houses on Mount estate. Architect is C. D. Taylor, 41 Baxtergate.

TRADE NOTES

Copper. The price of electrolytic copper was increased by £4 to £231 per ton delivered, from April 1.

Aluminium. From April 1, the price of 99% to 99·5% purity virgin aluminium in ingot form was raised from £148 to £154 per ton delivered. The Minister of Supply has also made an order increasing the price of aluminium scrap from the same date. The price of tungsten ore has been reduced from 535s. to 500s. per ton delivered.

Change of Address. The Sales Department of Truvox Ltd. has removed to new offices adjoining the company's Wembley works. Telephone No., Wembley 1212.

Distributors.—Portland Factors (Electrical Supplies) Ltd. have opened stores and a trade counter at 62 Portland Rd., Nottingham.

Expansion. To meet the needs of increasing trading and personnel, the head office of Giles (Electrical Engineers) Ltd., is now at 1a Southampton Row, London W.C.1. Additional display and demonstration space is now in use at 11 Victoria Colonnade, Southampton Row, supplementing the radio and television on show at 9 Victoria Colonnade.

New Phone No. The new telephone number of Preece, Cardew and Rider is Whitehall 7353.

Projector Arrangements. Under an agreement concluded with the Victor Animatograph Corporation of Davenport, Iowa, U.S.A., E. K. Cole Ltd. are to market in Gt. Britain and certain overseas territories the Victor 16 mm. film projector manufactured in this country. Mr. J. C. Rogerson is manager of the new department known as the British Victor Division, operating from 5 Vigo Street, W.1.

Representatives. Smart & Brown (Engineers) Ltd. announce that Mr. M. Parker, Mr. D. A. Norris, and Mr. R. C. Mackenzie, have been engaged as representatives to cover the London and the Home Counties area. They will operate from the firm's office at No. 8 Rose and Crown Yard, King St., St. James St., S.W.1.

Sulphuric Acid. As from April 1 the maximum prices of sulphuric acid was reduced by about 7%. Weak acid was reduced 5s. 10d. a ton and strong acid by 8s. 6d. Maximum prices of ground sulphur is also decreased.

MARCONI'S WIRELESS TELEGRAPH

Turnover Again Larger

THE 54th annual general meeting of Marconi's Wireless Telegraph Co. Ltd. was held on March 27 in London.

Sir George H. Nelson, F.C.G.I., M.I.Mech.E., M.I.E.E., the chairman, in the course of his speech, said:

A satisfactory increase is again recorded in turnover with a corresponding rise in our trading profit, achieved against growing competition and continued rising costs.

The profit for the year after deducting all charges, but before making provision for taxation, etc., is £74,490 higher than in 1950 at £356,381. Tax provision, however, is £89,132 heavier at £171,714, and after allocating a further sum of £25,000 to the depreciation equalisation reserve, the net profit for the year is £159,667, which, due entirely to increased taxation, is £4,642 less than in 1950. Your directors recommend a dividend of 7 per cent. less tax on the Ordinary shares.

The double load of increasing exports and preparing for defence weighs heavily on all branches of our national activity. In times like these the load falls very heavily on firms like our own which possess research, development and engineering productive capacity, and in these respects your company stands second to none.

Continued Demand

The value of our export sales in 1951 was nearly 50 per cent. greater than that of the previous year, which was itself a record year. Enquiries for our products continue from all over the world, but the raw materials are now getting harder to come by.

Sales of our radio communication equipment in 1951 were again greater than in the previous year, and the demand for our well-established high frequency point-to-point communication equipment continues, together with the demand for our very high frequency multi-channel radio telephone communication systems.

Our aircraft radio compasses are giving reliable service all over the world. Several foreign air lines will shortly be using the latest types they have recently purchased here, and which have been specified for new British airlines. The age of supersonic speeds continually poses the most complex problems in connection with the responsibility for making flying safer, and our AD 200 v.h.f. direction-finder is astonishingly effective.

Since we introduced wireless for safety at sea, it has shown a steady improvement, and in 1951 has sustained this advance.

The outstanding television event of 1951 was the opening of Britain's third great television station, at Holme Moss. The occasion made history of a special kind, for this was the first time that the entire design and manufacture of a complete television station had been entrusted to any one firm—Marconi's Wireless Telegraph Co.

Ten years have now passed since Marconi Instruments Ltd. became a wholly owned subsidiary of the M.W.T. Co. This company, with its ever widening range of electronic and electro-medical apparatus, now has a turnover of more than £1 million a year. The report was adopted.

ENGLISH ELECTRIC COMPANY

All Previous Records Surpassed. Sir George Nelson on Group's Continued Expansion

THE thirty-third annual general meeting of the English Electric Co., Ltd., was held on March 27 in London.

Sir George H. Nelson, F.C.G.I., M.I.Mech.E., M.I.E.E. (chairman and managing director), in the course of his speech, said: Turnover and production have again been substantially increased in volume and value during the year and the net profit has risen by £203,984 to £1,132,550, thus in all respects creating records over past achievements. The consolidated net profit has risen by £276,829 to £1,326,721. These figures show that the subsidiary companies have more than maintained their earnings during the year.

The expansion of the company's business, the rising costs on both capital and revenue accounts, and the absence of depreciation allowances adequate to meet the fall in the purchasing power of the £ in terms of the replacement of plant, make it wise, in the interests of the shareholders, to follow a conservative profit distribution policy. It is proposed, therefore, to transfer £550,000 to the general reserve, and to pay a final dividend of 10% less income tax on the Ordinary stock, making a total of 15% less income tax for the year, leaving the carry forward at £477,186, which is £188,434 more than last year.

Inflation remains a serious threat to our national economy. Workpeople are often misled into thinking that high profits are the main cause of inflation, by those who are either ill-informed or mischievous and anxious to disturb the stability of industrial relations. We wish it to be widely known that the level of profits in our company is extremely modest and does not contribute to the lowering of the purchasing power of the £.

TAXATION.—Some of Mr. Butler's proposals for the coming year are encouraging steps to better things. In industry I feel convinced that the proposed changes in allowances must encourage the workers to give all the overtime and week-end work that is asked of them, enabling the man who does not at present pay tax to provide himself with extra income to meet extra costs consequent upon the reduction in subsidies on foodstuffs; in other words, beat the crisis by longer hours and more output.

Increased Exports

By heavy capital expenditure after the war on plant and research equipment, by intensive selling efforts in our markets throughout the world, and stupendous efforts by our production executives, the company has increased its turnover since 1946 by £24 millions and raised the percentage of its exports from 20% before the war to 50% of a vastly greater volume of business today.

The demands of the defence programme have presented us with the problem of maintaining a just balance between the immediate demands of rearmament and the country's vital need to earn

income from overseas—particularly dollars—while following a course which enables us to fulfil our basic policy of stability of employment for our staff and workpeople when rearmament work declines.

Research, Development and Training

By far-seeing research, intensive development, the provision of the most up-to-date manufacturing facilities, and the training of engineers and skilled craftsmen we feel we have done everything humanly possible within our own organisation to provide for the future. Although we can play some part in inspiring future progress, its speed is not entirely in our hands but depends largely on the action of Governments both in encouraging the production of basic materials and in the furtherance of the economic integration of the British Commonwealth.

We are not pessimistic about the future, provided that everybody in the country plays his part in checking inflation and that a solution is found to the country's problem of balancing its external payments. If these two essentials are not dealt with the outlook is very obscure.

The report was adopted, and approval was given to the proposed increase of the authorised capital to £10,000,000.

MEETINGS TO NOTE

THURSDAY, APRIL 3

A.S.E.E. (S. London Branch).—Discussion on "General Installations." Cafe Royal, Croydon, 8 p.m.

INCORP. PLANT ENGRS. (Peterborough).—"Modern Dairy Plant." C. H. Macquire, Gas Board, Church St., 7.30 p.m.

BRIT. INSTN. OF RADIO ENGRS. (London).—Discussion on "V.H.F. and U.H.F. Broadcastng." P. Adorian. School of Hygiene, Keppel St., W.C.1, 6.30 p.m.

PHYSICAL SOCIETY'S EXHIBITION opens at Imperial College and continues until April 8.

WORCESTER ELECTRIC CLUB.—"Factory Electrical Installations." E. Bayliss. Talbot Hotel, Tything 7.15 p.m.

I.E.S. (Manchester Centre).—"Fluorescent Lamps for Lighting of Stage and Auditorium." J. W. Strange. Town Hall Extension, 6 p.m.

I.E.S. (Nottingham Centre).—"Artificial Lighting for Cinema Studios." E. J. G. Beeson. E. Midlands Elect. Board, Smithy Row, 5.30 p.m.

I.E.E. (London).—"Logical Approach to Problems of Electric Space-Warming." D. H. Parry. Savoy Place, W.C.2, 5.30 p.m.

I.E.E. (Mersey and N. Wales Centre).—Annual meeting. Discussion on "Should Broadcasting be Superseded by Wire Distribution?" P. P. Eckersley. Liverpool Royal Institution, Colquitt St., 6.30 p.m.

FRIDAY, APRIL 4

INSTN. OF MECHANICAL ENGRS.—"Factory Maintenance Engineering Dept." Max Bentham. Storey's Gate, S.W.1, 5.30 p.m.

I.E.S. (Bath and Bristol Centre).—Annual luncheon and Presidential Address. Royal Hotel, College Green, Bristol.

I.E.S. (Huddersfield Group).—Annual meeting at Elect. Showrooms, Market St., 7.15 p.m.

I.E.E. (Sheffield Sub-centre).—Annual dinner-dance at Royal Victoria Hotel, 7.30 p.m.

MONDAY, APRIL 7

A.S.E.E. (Leeds Branch).—Problems night at Gt. Northern Hotel, Wellington St., 7.30 p.m.

A.S.E.E. (N.E. London Branch).—"Power Station Engineering." H. D. Watson. Angel Hotel, Ilford, 8 p.m.

A.S.E.E. (Sheffield Branch).—"Control of Machine Tools." K. M. Swash. Royal Victoria Station Hotel, 7,30 p.m.

INST. OF FUEL (N.E. Section).—Annual meeting. "Power Station Chemistry during last 40 years." W. S. Coates. 2.30 p.m.

I.E.E. (E. Midlands Centre).—Convention on Electrical Contacts opens today at Loughborough College.

E.P.E.A. (London).—"Advance in Lamps and Lighting." L. J. Davis. Caxton Hall, S.W.1, 7 p.m.

RADIO COMPONENT SHOW.—Opens at Grosvenor House for 3 days.

I.E.E. (London Supply and Utilisation Sections).—Joint dinner and dance at Cafe Royal, 6.45 p.m.

I.E.E. (N.E. Centre).—Annual meeting and conversazione at Station Hotel, Newcastle, 6.15 p.m.

I.E.E. (S. Midland Centre).—Discussion on "Position of Cathode Ray Oscillograph in Electrical Engineering." W. Wilson. James Watt's Inst., Birmingham, 6.30 p.m.

I.E.E. (S. Midland Supply and Utilisation Group).—"New Power Stroboscope for High-Speed Flash Photography." W. D. Chesterman, D. R. Glegg, G. T. Peck, and A. J. Meadowcroft. Imperial Hotel, Birmingham, 6 p.m.

I.E.E. (Southern Centre).—Faraday Lecture on "Sound Recording—Home, Professional, Industrial and Scientific Applications." G. F. Dutton. Guildhall, Southampton, 6.30 p.m.

TUESDAY, APRIL 8

A.S.E.E. (Bolton Branch).—"Refrigeration." Mr. Crowshaw. Balmoral Hotel, Bradshawgate, 8 p.m.

INCORP. PLANT ENGRS. (E. Lancs.).—"Mechanical Stokers and Coal Handling Plant." R. F. W. Guy and J. P. Lander. Engrs' Club, Albert Sq., Manchester, 7.15 p.m.

INCORP. PLANT ENGRS. (Edinburgh).—"Development of Modern Lubricating Oils." D. T. McHutchison. 25 Charlotte Sq., 7 p.m.

NEWPORT ELECTRIC CLUB.—"Electricity in Transport." Dr. E. H. Norgrove. Tredegar Arms Hotel, 7 p.m.

I.E.S. (London).—"Present Position of Luminescence as applied to Lighting." A. H. McKeag and H. G. Jenkins. Lighting Service Bureau, Savoy Hill, W.C.2, 6 p.m.

I.E.E. (N.W. Utilisation Group).—"Inherent Current Voltage and Speed Control in Dynamo-Electric Machinery." J. C. Macfarlane, J. W. Macfarlane and W. J. Macfarlane. Engineers' Club, Albert Sq., Manchester, 6.15 p.m.

I.E.E. (N. Ireland Centre).—"Some Notes on Electrical Installations in Large Chemical Factories." D. B. Hogg. Presbyterian Hostel, Howard St., Belfast, 6.45 p.m.

WEDNESDAY, APRIL 9

A.S.E.E. (Bradford Branch).—Film presented by L. Bruce at Midland Hotel, 7.30 p.m.

BRITISH INSTN. OF RADIO ENGRS. (N.E. Section).—"VHF Broadcasting—Case for Amplitude Modulation." J. R. Brinkley. Neville Hall, Westgate St., Newcastle, 6 p.m.

I.E.E. (London Radio Section).—Symposium of papers on Microwave Links. Savoy Place, W.C.2, 5.30 p.m.

I.E.E. (N. Lancs. sub-centre).—"Economic Plant Sizes and Boiler Set Groupings on British Grid." B. Donkin and P. H. Margen. N.W.E.B., Darwen St., Blackburn, 7 p.m.

I.E.E. (Scottish Centre).—"Design and Performance of Surge Diverters for Protection of A.C. Systems." T. F. Monahan. Heriot-Watt College, Edinburgh, 7 p.m.

THURSDAY, APRIL 10

INCORP. PLANT ENGRS. (Newcastle-on-Tyne).—"Applications of Hydraulics." D. V. Rowles. Roadway House, Oxford St., 7.30 p.m.

BRITISH INSTN. OF RADIO ENGRS. (Scottish Section).—"X-ray Equipment and the Control Gear." C. S. Norton. Metrovick, Watling St., Motherwell, 7 p.m.

I.E.E. (N.E. Scotland sub-centre).—Annual meeting at Royal Hotel, Dundee, 7 p.m.

E.P.E.A. (Mersey Tech. Group).—"Protection of Power Transformers." H. T. Sheppard. Elect. Showrooms, Whitechapel, Liverpool, 7 p.m.

FRIDAY, APRIL 11

A.S.E.E. (Crewe Branch).—"Motor Fault Locating and Rewinds." D. Bosworth. Copeland Arms Hotel, Glebe St., 7.30 p.m.

TUESDAY, APRIL 15

INCORP. PLANT ENGRS. (Glasgow).—"Development of new Mechanical Engineering Research Laboratory at E. Kilbride." T. C. Crowhall. 351 Sauchiehall St., 7 p.m.

Electrical Contractors:
DUNCAN WATSON (Electrical Engineers) Ltd
Kelvin House,
24 Cleveland Street, London, W.1

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HEADQUARTERS—LONDON

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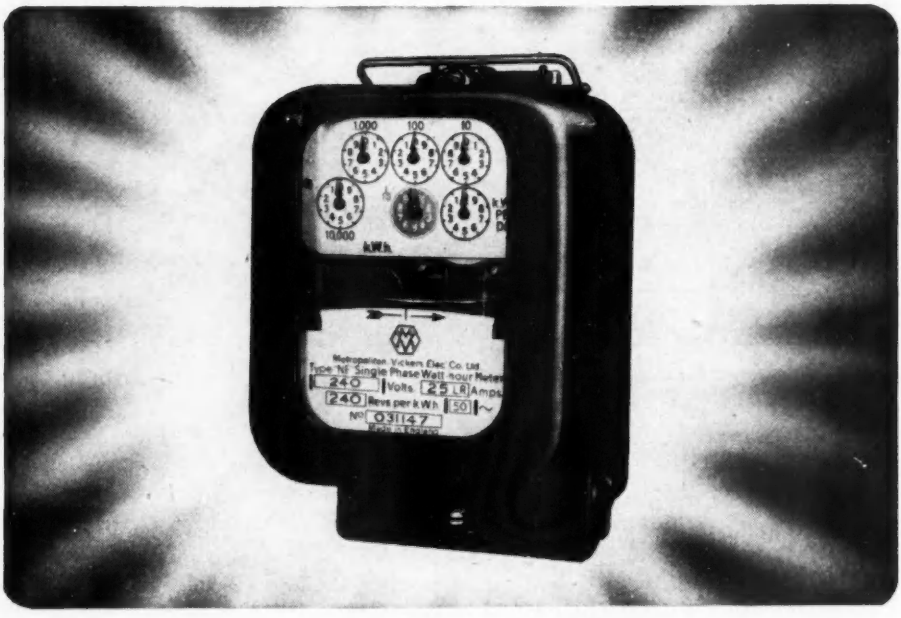

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Member of the A.E.I. group of companies

METROVICK *Instruments, meters and relays*

G83

CLASSIFIED ADVERTISEMENTS

OFFICIAL TENDERS AND APPOINTMENTS

WANTED · FOR SALE WORK WANTED

Those wishing to advertise in these pages should send the text to the Classified Advertisement Dept., Electrical Times, Sardinia House, Sardinia Street, London W.C.2, before 10 a.m. on TUESDAY of week of issue. Official Displayed Advertisements are charged at 42s. per inch, and all other classified advertisements at 3s. per line. Situations Wanted will be published four times for twice the single insertion rate. Fee for Box No. and postage on replies is 2s.

PUBLIC NOTICES

E' EXCEL LIMITED

(IN MEMBERS' VOLUNTARY LIQUIDATION)
Victor Works, Broadgreen, Liverpool 14.

NOTICE IS HEREBY GIVEN that arrangements have been made with Selex Electric Company, Yardley Road, Kirkby Trading Estate, near Liverpool, for the manufacture and supply of certain spares required for the servicing and maintenance of Xcel cookers and other products previously manufactured by Elexcel Ltd.

Arrangements are also being made to transfer outstanding orders for such spares received by Elexcel or by the liquidators, to Selex Electric Company who have confirmed that every effort will be made to give prompt delivery.

All inquiries for spares for Xcel products should in future be addressed direct to Selex Electric Company at the address of the latter as given above.

Claims for free replacements of faulty parts under guarantee issued with Xcel products should also be sent to Selex Electric Company who have been authorised by the liquidators to carry out such work on their behalf.

W. P. SCOWCROFT.
G. D. CHRISTIE.
Joint Liquidators. (S 2)

TENDERS INVITED

COUNTY BOROUGH OF SWANSEA

West Penlan Primary School, Swansea

TENDERS FOR ELECTRICAL INSTALLATION

FIRMS wishing to tender for the electrical installation at the West Penlan Primary School, now in course of erection at Penlan, Swansea, are invited to submit their applications to the Borough Architect, The Guildhall, Swansea, on or before Saturday, April 19, 1952.

Plans, specifications and conditions of contract can be obtained on application and deposit of £2 provided the applicant gives satisfactory evidence of having previously carried out work of a similar character. The deposit will be refunded after delivery of a bona fide tender (which is not subsequently withdrawn) and the return of all documents.

No guarantee is given that the lowest or any other tender will be accepted.

T. B. BOWEN,
Town Clerk.

The Guildhall,
Swansea.
March 29, 1952. (S 51)

APPOINTMENTS VACANT

Engagement of persons must be made through a Local Labour Office or Scheduled Employment Agency, if the applicant is a man aged 18-64, or a woman aged 18-59; unless the person concerned is excepted or the employment is in a managerial or professional capacity, or is otherwise excepted from the provisions of the Notification of Vacancies Order, 1952.

AMENDMENT (March 27 issue)—B.E.A., South Wales Division. General Assistant Engineers. The salary scale for this position should have read £481-£655 and not £481-£665 as stated. (R 469)

CITY OF BELFAST

APPOINTMENT OF CITY ELECTRICAL ENGINEER AND GENERAL MANAGER

THE COUNTY BOROUGH COUNCIL OF BELFAST are prepared to receive applications for the position of Electrical Engineer and General Manager of their Electricity Undertaking on the salary scale of £2,300 by £100 to £2,700 by £50 to £2,750, the commencing salary to be determined in the light of the qualifications and experience of the person appointed to the position.

Candidates, as well as having the necessary technical qualifications must have occupied a position of responsibility in a large Electricity Undertaking.

Preference will be given to ex-service candidates possessing the necessary qualifications, provided the appointing Committee is satisfied that such candidates can, or within a reasonable time will be able to, fill the post efficiently.

Canvassing for the appointment in any form, oral or written, direct or indirect, if proved to the satisfaction of the appointing authority will be a disqualification.

Applications must be made on official forms, which, with copy of the conditions of appointment, can be had from the undersigned. Completed applications enclosed in envelopes endorsed "City Electrical Engineer and General Manager" must be lodged with the undersigned not later than Saturday, 26th April, 1952.

JOHN DUNLOP,
Town Clerk.
City Hall, Belfast.
March, 1952. (S 38)

BRITISH ELECTRICITY AUTHORITY

Midlands Division

GENERAL ASSISTANT ENGINEER required in the Chief Generation Engineer's (Construction) Department at Wolverhampton. National Joint Board service conditions, superannuable appointment; salary within Schedule "C," Class "AX/DX," Grade 6, £481 to £674 per annum.

Candidates should hold Higher National Certificate in Mechanical Engineering and have had experience in design and installation of mechanical equipment for power stations and industrial works, and/or a knowledge of boiler and turbine design in the contracts department of a large engineering works.

Forms of application, available from Establishments Officer, 53 Wake Green Road, Moseley, Birmingham 13, to be returned by April 19, 1952.

F. W. LAWTON,
Divisional Controller.
(S 13)

NORTH OF SCOTLAND HYDRO-ELECTRIC BOARD

APPLICATIONS are invited for the post of SECOND ASSISTANT ENGINEER (Transmission) at the Board's Head Office in Edinburgh.

Applicants should have at least five years' experience, covering construction, operation and maintenance of 132 kV substations and overhead lines.

The salary will be in accordance with the N.J.B. Agreement, Schedule "C." Class AX/BX, Grade 2, commencing at a point within the range £809-£945, depending on experience and qualifications. Superannuation Scheme applicable.

Application form obtainable from The Secretary, 16 Rothesay Terrace, Edinburgh 3, should be returned within 14 days of the appearance of this advertisement. (S 3)

BRITISH ELECTRICITY AUTHORITY

North Western Division

VACANCY No. 698

SHIFT CHARGE ENGINEER, Blackpool Generating Station. Salary £613-623 (N.J.B. D7). Apply to Establishments Officer, 825 Wilmslow Road, Manchester 20, not later than April 9. (S 41)

YORKSHIRE ELECTRICITY BOARD

APPLICATIONS are invited for the following appointments:—

No. 4 (Leeds) Sub-Area

GENERAL ASSISTANT ENGINEER (Distribution Design) (Vacancy No. 48/52)

Applicants should hold at least the Higher National Certificate in electrical engineering or equivalent qualification and have had construction or operation experience on overhead and underground distribution systems up to 33 kV.

Experience in planning and estimating will be an advantage.

Salary: N.J.B. Grade 13, Class "K", £563 to £585 p.a.

Applications, stating the above vacancy number, and giving full details of age, qualifications, and experience, should be forwarded to the Manager, No. 4 (Leeds) Sub-Area, Yorkshire Electricity Board, Bramhope, Leeds, not later than April 18, 1952.

No. 3 (Sheffield) Sub-Area

INSTALLATION ENGINEER (Rotherham-Mexborough District). (Vacancy No. 35/52).

Applicants should possess a sound technical training, have served a full apprenticeship with a recognised firm of electrical contractors and subsequently have had a wide experience of all classes of electrical contracting work covering installations for lighting, heating and power.

Details should be given of experience in the following matters:—

Preparation of specifications, estimates and tenders for all classes of installation work. Heavy industrial power installation work, particularly in regard to the steel industry. Application of I.E.E. Wiring Regulations and other relevant regulations covering electrical contracting work. Maintenance work including knowledge of rewinding and repair of electrical machinery. Layout and supervision of installation on site. Control of staff and workpeople. Administration.

Salary: N.J.B. Agreement, Class "H", Grade 8, £697 to £726 p.a.

Applications, stating the above vacancy number, and giving full details of age, qualifications, and experience, should be forwarded to the Manager, No. 3 (Sheffield) Sub-Area, Yorkshire Electricity Board, Commercial Street, Sheffield, not later than April 18, 1952. (S 30)

MIDLANDS ELECTRICITY BOARD

APPLICATIONS are invited for the following superannuable posts:—

2nd ASSISTANT DISTRICT COMMERCIAL ENGINEER (INDUSTRIAL)

Birmingham and District Sub-area, North East District.

Duties involve advising consumers on most suitable electrical equipment for their purpose and will include control of an Industrial Showroom. Experience necessary in applications of electricity for industrial uses. Technical qualifications desirable. Salary £697 per annum N.J.B., Grade H 8. Applications within 14 days stating age, qualifications, experience and present salary, endorsed "2nd Assistant District Commercial Engineer" to Emil Braathen, Sub-Area Manager, Midlands Electricity Board, 14 Dale End, Birmingham, 4.

JUNIOR ENGINEER (CONSTRUCTION)
North Staffs. Sub-Area H.Q.

Construction experience in heavy industrial and rural areas necessary. Duties will also involve the preparation and checking of data schedules for overhead lines and substations up to and including 33 kV. Technical qualifications desirable. Salary £505 per annum N.J.B., Grade J 14. Applications within 14 days stating age, qualifications, experience and present salary together with copies of two recent testimonials to Mr. H. A. P. Caddell, Sub-Area Manager, Midlands Electricity Board, 31 Kingsway, Stoke-on-Trent.

A. STEPHENS,
Secretary.
(S 40)

BRITISH ELECTRICITY AUTHORITY

Midlands Division

ASSISTANT SECTION ENGINEER required in the Birmingham Transmission Section. National Joint Board service conditions, superannuable appointment; salary within Schedule "C," Class "AX/DX," Grade 6, £564 to £762 per annum.

Applicants should be Corporate Members of the Institution of Electrical Engineers or hold equivalent qualifications and should have had experience in the operation and maintenance of high-voltage transmission lines, cables, switching and transforming stations up to 132 kV.

Forms of application, available from Establishments Officer, 53 Wake Green Road, Moseley, Birmingham 13, to be returned by April 19, 1952.

F. W. LAWTON,
Divisional Controller.
(S 14)

BRITISH ELECTRICITY AUTHORITY

Eastern Division

APPLICATIONS are invited for the following Superannuable positions. Salaries and conditions of service will be in accordance with the National Joint Board Agreement:—

JUNIOR ENGINEER
Letchworth Generating Station.

Duties will include assistance in the operation and testing of Station plant, particularly the testing and control of process water and the servicing and adjustment of instruments and automatic controls.

The candidate should have had training or experience in similar types of work. Previous experience in a Generating Station and technical training to Ordinary National Certificate standard will be an advantage.

JUNIOR ENGINEER
Luton Generating Station.

Applicants should preferably have reached the standard of the Ordinary National Certificate in Electrical Engineering or its equivalent. Previous experience with Rotary Converting Plant and/or in a Generating Station will be an advantage.

Salary for both of these positions:—
Class "E," Grade 15, £375 to
Class "E," Grade 14, £426 per annum.

Commencing salary will depend on qualifications and experience.

Applications stating age, qualifications and experience, should be sent to the Divisional Controller, British Electricity Authority, Eastern Division, Northmet House, Southgate, N.14 by April 19, 1952.

W. N. C. CLINCH,
Controller.
(S 42)

LONDON ELECTRICITY BOARD

ENGINEER (OPERATION AND MAINTENANCE)

APPLICATIONS are invited for the above position in the City District of the Northern Sub-Area.

Applicants should have had a sound technical education up to at least Higher National Certificate standard, preferably being Corporate Members of the I.E.E., and possess a practical experience of all branches of engineering work associated with the organisation of a district distribution department, particularly in regard to mains and substation work, on both a.c. systems (single and three-phase) and d.c. systems.

The post is graded under Schedule "A" of the National Joint Board Agreement as Class "E," Grade 7, £660/9s. 0d. per annum rising to £693 per annum, inclusive of London Allowance.

Application forms obtainable from Establishments Officer, 46 New Broad Street, E.C.2, to be returned completed by April 5, 1952. Please enclose addressed foolscap envelope and quote Ref. V/1403/T. (S 18)

BRITISH ELECTRICITY AUTHORITY

East Midlands Division

APPLICATIONS are invited from suitably qualified engineers for the following superannuable post:—

35/42 ASSISTANT MECHANICAL MAINTENANCE ENGINEER
Longford Generating Station.

Candidates should have had a sound engineering training and be thoroughly conversant with repairs and maintenance of a large generating station.

Commencing salary will be in accordance with Class "G," Grade 8 (£658 to £683 per annum) of the N.J.B. Agreement.

Applications should be submitted on the official forms which may be obtained from the Divisional Establishments Officer, British Electricity Authority, Barker Gate, Nottingham, and should be returned not later than April 17, 1952.

L. F. JEFFREY,
Divisional Controller.
March 28, 1952. (S 43)

CROWN AGENTS FOR THE COLONIES

STATION ENGINEER required by the Gold Coast Government for the Electricity Department for two tours, each of 18-24 months. Salary (including overseas pay and temporary allowance), £920 a year. Outfit allowance £60. Gratuity on satisfactory completion of service at the rate of £25 for each three months' service. Free passages. Liberal leave on full salary. Candidates must have served a mechanical or electrical engineering apprenticeship and have a thorough practical knowledge of C.I. oil engines up to 1,200 b.h.p. and a.c. and d.c. electrical generation and distribution and pumping plant. —Apply at once by letter, stating age, full names in block letters and full particulars of qualifications and experience, and mentioning this paper, to the Crown Agents for the Colonies, 4 Millbank, London S.W.1, quoting on letter M.29137.B. The Crown Agents cannot undertake to acknowledge all applications and will communicate only with applicants selected for further consideration. (S 53)

CROWN AGENTS FOR THE COLONIES

POWER STATION OPERATING ENGINEERS required by the Government of Nyasaland for the Electrical Services Department for a tour of two to three years in the first instance. Commencing salary according to age and experience in scale £776 rising to £1,155 a year, including cost of living allowance. Outfit allowance £30. Free passages. Liberal leave on full salary. Candidates, age 23 to 33, must have technical knowledge at least up to National Certificate standard, and have had shift experience in a modern steam power station operating at 400 lbs. per square inch, 750 F.

Apply at once by letter, stating age, full names in block letters, and full particulars of qualifications and experience, and mentioning this paper, to the Crown Agents for the Colonies, 4 Millbank, London S.W.1, quoting on letter M.29131.B. The Crown Agents cannot undertake to acknowledge all applications and will communicate only with applicants selected for further consideration. (S 17)

NORTH WESTERN ELECTRICITY BOARD

APPOINTMENT OF DISTRICT COMMERCIAL ENGINEER
Stalybridge District.

DUTIES will include the organisation and control of all commercial staff and functions in the district; supply of information and advice to consumers on electricity utilisation, tariffs terms, apparatus and all matters concerning electricity service; organisation and supervision of maintenance work on consumers' premises, including emergency service, routine testing and repair of domestic appliances, including control of workshops; control of service centres and exhibitions; supervision of consumer records.

Salary scale: £946-£967-£989. Grade G.3. N.J.B. conditions.

Applications to Sub-Area Manager, No. 3 Sub-Area, The North Western Electricity Board, Electricity Offices, Union Street, Oldham, by April 12, 1952. (S 29)

CITY OF BULAWAYO

Southern Rhodesia

VACANCIES FOR SENIOR ENGINEERING ASSISTANTS, ELECTRICITY DEPARTMENT

APPLICATIONS are invited for the above positions on the salary grade £976 by £40 to £1,136 per annum. In addition there is a cost of living allowance presently fixed at approximately 11.25% of basic salary and children's allowances at the rate of £30 per annum for the first child and £24 per annum for each of the second and third children.

On this basis a person who is married and has three children will receive the following emoluments:—

	£ s. d.
Minimum of grade	976 0 0 per annum
Cost of living allowance	109 16 0 " "
Children's allowances	78 0 0 " "
	£1,163 16 0 per annum

Further details in connection with these vacancies may be obtained on application to the Council's London Agents, Messrs. Davis and Soper Ltd., 52 and 54 St. Mary Axe, London E.C.3.

Applications must be sent by AIR MAIL to the Town Clerk, P.O. Box 591, Bulawayo, Southern Rhodesia, so as to reach him by not later than noon on Friday, April 25, 1952.

H. J. COOK,
Town Clerk.

March 24, 1952. (S 16)

BRITISH ELECTRICITY AUTHORITY

Midlands Division

FIVE ASSISTANT SHIFT CHARGE ENGINEERS required at Nechells "B" Generating Station. N.J.B. service conditions, superannuable appointments; salary in accordance with Schedule "A," Grade "J9," commencing at £699 per annum.

National Certificate in Mechanical Engineering or an equivalent qualification required together with sound technical training and experience in the operation of a modern power station.

Forms of application available from Establishments Officer, 53 Wake Green Road, Moseley, Birmingham 13, to be returned by April 19, 1952.

F. W. LAWTON,
Divisional Controller.
(S 15)

BRITISH ELECTRICITY AUTHORITY

London Division

APPLICATIONS are invited for the following superannuable posts from candidates with sound engineering and technical training. Salaries and conditions of service in accordance with N.J.B. Agreement. Schedule "A," inclusive of London Allowance.

(a) SHIFT CHARGE ENGINEERS
St. Marylebone Generating Station.
(b) SHIFT CHARGE ENGINEERS
Islington Generating Station.
(c) ASSISTANT SHIFT CHARGE ENGINEERS
Brunswick Wharf Generating Station
(d) ASSISTANT SHIFT CHARGE ENGINEER
Bankside "A" Generating Station.
(e) ASSISTANT SHIFT CHARGE ENGINEER
Stepney Generating Station.

Qualifications up to Higher National Certificate, together with good education. Experience in modern power station operation and E.H.T. Switchgear essential. Character and ability to deal with Staff problems is important.

Salary (a) Class "E," Grade 7—£660 9s. p.a.
(b) Class "D," Grade 7—£643 13s. p.a.
(c) Class "H," Grade 9—£693
(d & e) Class "F," Grade 9—£616 7s.

The following vacancies also exist at Brunswick Wharf Generating Station, Class "H" (anticipated "K," in 1956.)

JUNIOR ENGINEER (Operation).
Knowledge of Boiler and Turbine Plant. Position offers experience of operation in all sections of the generating station. Grade 14—£504.

ASSISTANT ENGINEER (Repair and Maintenance Planning).
Practical experience of mechanical plant maintenance. Experience of planning and progressing overhauls of Boiler and Turbine plant is necessary. Grade 11—£616 7s. p.a.

INSTRUMENT ENGINEER.
Experience in automatic boiler equipment, steam and water meters repair and maintenance. Grade 12—£572 5s. p.a.

ASSISTANT MAINTENANCE ENGINEER (ELECTRICAL).
Experience of overhaul and maintenance of E.H.T. Switchgear, large motor and control gear essential. Grade 9—£693 p.a.

MAINTENANCE ENGINEER (MECHANICAL).
Wide experience necessary in maintenance of modern generating plant. Grade 7—£784 7s. p.a.

Applications are also invited for the following positions:—

POWER STATION SUPERINTENDENT
Battersea "A" & "B" Generating Stations.
Qualifications—sound technical training and wide practical experience in electrical and mechanical engineering and in power station practice.

Candidates must be competent works managers and good organisers, and have had practical experience with Negotiating and Consultative Committees, and in the promotion of good labour relations.

The officer will be responsible for the general management and operation of Battersea "A" and "B" power stations—capacity 413 MW (ultimate capacity 513 MW). Class "L," Grade 1—£1,523 p.a.

2nd ASSISTANT ENGINEER GENERATING (OPERATION)
Group 3 Headquarters, Queen Victoria Street, E.C.4.
Candidates must possess good technical qualifications and be familiar with operational requirements of modern generating stations.

Knowledge of salary and wage agreements of Electricity Supply Industry an additional qualification.

The successful applicant will be required to assist the Group Generation Engineer (operation) in matters relating to control of a large group of stations.

Salary within range £840 9s. to £992 5s. N.J.B. Schedule "C" Class "AX," Grade 2.

Applications, stating age, qualifications and experience should be addressed to Divisional Secretary, London Division, British Electricity Authority, Ergon House, Horseferry Road, S.W.1, to be received within fourteen days of the publication of this advertisement.

H. V. PUGH,
Divisional Controller.
(S 39)

SOUTH EASTERN ELECTRICITY BOARD

CARTOGRAPHER (Reigate District).

SALARY of £220 at age 20 to £355 at age 26, rising, subject to satisfactory and competent service, to £430 per annum. Superannuation will be arranged. Applicants should have had experience in the construction of mains record plans, and the reproduction of ordnance survey maps and general drawing office routine.

Application forms obtainable from C. Rowbotham, M.I.E.E., District Manager, SEEBoard, 6 and 8 Linkfield Corner, Redhill, Surrey, to be returned with names of two referees, through the Reigate Employment Exchange, by not later than April 15, 1952.

A. L. BURNELL,
Secretary.

March, 1952. (S 31)

LONDON ELECTRICITY BOARD

DEMONSTRATORS

APPLICATIONS are invited for positions as Demonstrator (Female) in the Barking and West Ham Districts of the North Eastern Sub-Area.

Applicants should be suitably qualified, holding the E.A.W. or other approved certificate including electrical housecraft, and have experience in conducting demonstrations at Service Centres and in general Service Centre duties. They should also be experienced in advising consumers on the selection and use of domestic appliances, both at the Service Centre and on consumers' premises.

The posts are graded within the National Joint Council Agreement (Administrative and Clerical Grades) as Grade I, i.e. £360 to £450 per annum, plus the appropriate London Allowance.

Applications, stating age and full details of qualifications and experience, to be submitted to the Ministry of Labour Employment Exchange, Frederick Street, Stratford, E.15, not later than April 12, 1952, quoting Ref. W.196/593. (S 52)

A WELL-KNOWN manufacturing firm of electrical engineers in the Midlands requires ENGINEERS for handling tenders and orders for motors, generators, and associated equipment. Starting salary according to age, experience, and qualifications. Some assistance with accommodation may be granted.—Please apply, with details of training, experience, etc., to Box No. 1599, Electrical Times. (R 422)

ACCOUNTS COST CLERK for Electrical Contractors, W. End. Previous experience essential.—Full details to Box No. 1625, Electrical Times. (S 8)

AN interesting vacancy exists at our Liverpool Works for a young GRADUATE ENGINEER with experience in Mechanical Engineering to work on the development of refrigeration apparatus and allied engineering. Previous refrigeration experience desirable, but not essential. Provision will be made for suitably housing the successful applicant.—Applications should be addressed, quoting reference 731A, to Central Personnel Services, English Electric Company, Ltd., 24/30 Gillingham Street, London, S.W.1. (S 4)

ASSISTANT DISTRIBUTION ENGINEER required by The Steel Company of Wales, Ltd., for large integrated Iron and Steel Works. Applicants must have had previous operating experience and be thoroughly conversant with modern protective gear and control circuits. Good technical training essential. Previous industrial and/or manufacturing experience would be an advantage. Ability to co-ordinate work of technical staff essential.—Applications, stating age, education, training, qualifications and experience should be submitted in own handwriting to The Personnel Superintendent, The Steel Company of Wales, Ltd., P.O. Box No. 3, Port Talbot. (S 7)

ASSISTANT FOREMAN INSPECTOR for Electrical Department. Experience of fractional horse-power motors essential.—Apply Personnel Manager, Frigidaire, Stag Lane, N.W.9. (S 45)

APPLICATIONS are invited for the position of SWITCHGEAR SALES ENGINEER at the Stafford Works of the English Electric Co., Ltd. Applicants should have at least a Higher National Certificate. Previous sales experience of large scale switching schemes as applied to power stations, sub-stations and industry is desirable.—Please write, giving full details and quoting ref. 250 to Central Personnel Services, English Electric Co., Ltd., 24-30 Gillingham Street, London S.W.1. (R 432)

APPLICATIONS are invited for the position of ASSISTANT to the Commissioning Engineer of the English Electric Co. Ltd. Essential requirements: Engineering Degree or H.N.C., an engineering apprenticeship or works experience in heavy electrical or mechanical industry, good address and a tactful personality. Age between 28 and 35. The successful applicant will be based at Stafford, but may be required to do a certain amount of travelling.—Please write, giving full details, quoting Ref. 978, to Central Personnel Services, English Electric Co. Ltd., 24-30 Gillingham Street, London S.W.1. (S 44)

BRITISH ELECTRICITY AUTHORITY Headquarters, London, require:—DRAUGHTSMEN with experience in either (a) reinforced concrete design and detail; (b) layout of outdoor sub-stations or electrical diagrams; or (c) general electrical work, charts and statistics, etc.

Salary according to experience, within N.J.B. Grade 6, £438-£574 including London Allowance.

Forms from D. Moffat, Director of Establishments, British Electricity House, Great Portland Street, London W.1. Quote reference AE/236. (S 27)

BOX No. replies to be addressed to the ELECTRICAL TIMES, Sardinia House, Sardinia Street, London W.C.2

FOREMAN/JOINTER

A FOREMAN/JOINTER is required for work in Singapore and Malaya. The engagement will be on a 3-year agreement at a salary of $475.00 Malayan dollars per calendar month with a cost of living allowance of $175.00 Malayan dollars per month. (The current rate of exchange is $8.55 Malayan dollars=£1 sterling); bachelor quarters will be provided free. Air passage to Singapore will be paid and a return passage (with 18 weeks leave on full pay) will be provided on the satisfactory conclusion of the service period. Applicants should be unmarried and should have experience of all types of power cable jointing up to and including 11 kV. The successful applicant will be required to fly to Singapore in August, but in the meantime employment can be offered at London rates on cable installation contracts in Great Britain. Applicants should state age and experience in detail in addition to name and address.—Please apply to:

Box No. 1639,
Electrical Times

(S 54p)

B.B.C. requires SENIOR TELEVISION ENGINEER with responsibility for operating and maintaining all radio link transmitting and receiving equipment (mainly centimetric waves) used for television outside broadcasts in Glasgow and Edinburgh areas, including advance planning and testing proposed circuits. Minimum qualifications: Higher National Certificate in electrical engineering. Candidates must have thorough training and experience in practice of shortwave transmission and reception; familiarity with television principles and special problems of wideband modulation (AM and FM) essential. They must be able to drive a car with confidence and hold a current driving licence. Organising and administrative ability essential. Starting salary £695 with increments to £930 p.a.—Applications to Engineering Establishment Officer, Broadcasting House, London W.1, within 7 days. (S 33)

BRITISH ELECTRICITY AUTHORITY require in the Transmission Design Branch at Headquarters, London—

1. SECOND ASSISTANT ENGINEER (Overhead Lines). Candidates should be familiar with all aspects of design, construction and maintenance of overhead lines, and have good field experience of 132 kV steel tower line construction. Salary N.J.B. Grade 3, £814-£1,184 p.a. including London Allowance.

2. THIRD ASSISTANT ENGINEER (Protective Gear). Candidates should have all-round experience in the theory and practice of modern types of protective gear for large high voltage systems, a general knowledge of electrical plant characteristics and be accustomed to the preparation and interpretation of complex wiring diagrams. Salary N.J.B. Grade 4, £732-£954 p.a. including London Allowance.

Candidates for both the above vacancies should have qualifications not less than A.M.I.E.E. Standard Pension Scheme. Applications to D. Moffat, Director of Establishments, British Electricity House, Great Portland Street, London W.1, not later than April 18. Quote reference AE/237. (S 26)

BRITISH ELECTRICITY AUTHORITY require a SENIOR ASSISTANT ENGINEER in the Co-ordination Sub-Branch of the Generation Construction Sub-Department at Headquarters in London, to be responsible for co-ordinating construction work at a group of power stations. Duties entail attendance at Site Meetings and visits to power stations. Practical experience in construction of modern power stations including handling of contracts, preparation of commissioning programmes, work on site and co-ordination of projects from inception to commissioning are essential.

Candidates must hold requisite qualifications for Associate Membership of I.Mech.E. or I.E.E. Salary N.J.B. Grade 1, £975-£1,353 inclusive of London Allowance Pension Scheme.

Letters of application, stating age, qualifications and experience, present position and salary, to D. Moffat, Director of Establishments, British Electricity House, 170 Great Portland Street, London W.1, to be returned by April 18, 1952. Quote reference AE/238. (S 28)

DESIGNERS REQUIRED experienced in electronic control gear. Good electrical-mechanical design and layout ability essential. Successful applicants will be required to work in the Victoria area of London. Excellent opportunities for men of proved ability. Good salaries paid to experienced men.—Reply, stating age and salary required, giving full details of works, D.O. and technical training to Box No. 1603, Electrical Times. (R 433)

ENGINEER required with specialised knowledge of stator winding by machine for shaded pole electric motors, by old-established manufacturing firm in South Staffordshire.—Box No. 1623, Electrical Times. (S 6)

Engagement of persons must be made through a Local Labour Office or Scheduled Employment Agency, if the applicant is a man aged 18-64, or a woman aged 18-59; unless the person concerned is excepted or the employment is in a managerial or professional capacity, or is otherwise excepted from the provisions of the Notification of Vacancies Order, 1952.

DRAUGHTSMEN having experience in the layout of unit type low tension panels and distribution equipment required. 5-day week. Staff pension fund.—Apply in writing stating age, experience and salary required, to the Personnel Officer, W. T. Henley's Telegraph Works Co., Ltd., Gravesend. (R 420)

ELECTRICAL DRAUGHTSMAN required. Used to network and schematic diagrams, sub-station layouts, taking off quantities and preparing specifications of installation work. At least O.N.C. required. Permanent and pensionable post.—Reply to Box No. 1621, Electrical Times, quoting reference KE. (R 472)

ESTIMATOR required by electrical contractors on south coast. Capable of planning installations for all types of buildings. Will applicants please state experience in detail, and salary required.—Box No. 1591, Electrical Times. (R 390)

GENERAL FOREMAN required for S.E. London factory (70 employees). Must have specialised knowledge and experience of transformer and rectifier manufacture and also electrical assemblies. Additional manufacturing experience of small resistance welding machines would be a definite advantage.—Write, giving details of experience and salary required, to Box No. 1587, Electrical Times. (R 384)

INSULATION ENGINEERS are required by the English Electric Co., Ltd., in Stafford for experimental work on the insulation of all types of machinery, switchgear and transformers. Applicants should have a university degree or equivalent and experience of insulation development or research will be an advantage. Preference will be given to those aged between 25 and 35.—Please write, giving full details and quoting Ref 433A to Central Personnel Services, English Electric Co., Limited, 24-30 Gillingham Street, London, S.W.1. (S 55)

JOHN BRUCE AND PARTNERS, Consulting Engineers, invite applications from MECHANICAL, ELECTRICAL and CONSTRUCTIONAL ENGINEERING DRAUGHTSMEN. Applicants should have a wide experience of power station layout work, industrial steam and electrical work, supervision of site work and, for one or two vacancies, a knowledge of Spanish is desirable. Applicants should not be over forty-five years of age. Location of office work—London.—Applications, in the first instance, should be addressed to Box No. 1627, Electrical Times. (S 19)

JUNIOR DEVELOPMENT ENGINEER, aged 24 to 30, required for research and development work on domestic electrical equipment manufactured by a large engineering company with laboratories in the West London area. Applicants should have Higher National Certificate or Inter. B.Sc., and should preferably have served an apprenticeship. Salary at 25 years, £10 15s. Five-day week, canteen facilities, etc.—Write, giving details of qualifications and previous experience, to Box No. 1637, Electrical Times. (S 50)

SALES REPRESENTATIVE required for an area including Yorkshire, Lincolnshire, Nottinghamshire and part of Derbyshire, for the sale of low tension switch and distribution gear.—Applications in writing, stating previous experience, qualifications and details of salary, together with references to The Sales Manager, Bill Switchgear, Ltd., Aston Lane, Perry Barr, Birmingham 20. (S 5)

SECTION LEADER DRAUGHTSMAN, Merseyside and North Wales Electricity Board, Ref. 40C, No. 3 Sub-Area Headquarters, Electricity House, Newgate Street, Chester. Salary £651 to £755 p.a. (N.J.B. Schedule "D", Grade 4).

Applicants should possess the Higher National Certificate in electrical engineering, and have had experience on the preparation of drawings in connection with sub-station and building construction, and the layout of h.v. and m.v. switchgear and associated equipment, cables, etc.

The appointment is superannuable and subject to a medical examination.

Application forms obtainable by written request from the Manager. Closing date April 14, 1952. (S 32)

SENIOR ELECTRICAL DRAUGHTSMEN for modern London office, preferably with experience of power distribution and lighting installations as applied to chemical and oil refinery plants. Qualifications to H.N.C. standard. Good conditions, 5-day week, pension scheme.—Write full particulars, age, qualifications and experience to Box 5729, c/o Charles Barker and Sons Ltd., 31 Budge Row, London, E.C.4. (R 438)

VENNER LTD. require a TIME SWITCH REPRESENTATIVE for India. Excellent prospects for single man.—Write, giving full details of experience, to Venner Ltd., Kingston By-Pass, New Malden, Surrey. (S 9)

WORKS MANAGER for London area fully experienced in the manufacture of medium-sized power transformers. Some knowledge of design, drawing office and testing work is desirable.—Apply, stating age, experience and salary expected to Box No. 1611, Electrical Times. (R 462)

APPOINTMENTS WANTED

EXPERIENCED ELECTR. MECH.: ENGR.: SALES REPR. Seeks agency for pumps and motors in southern counties.—Box No. 1573, Electrical Times. (R 359)

WORK WANTED

A.C. and d.c. Motor Rewinds and Repairs. Prompt service, fully guaranteed. Edgware 8631 (4 lines).—Service Electric Co., Ltd., Stanmore, Middx. (D 324)

CASTINGS. Fisher Foundries, Ltd., Greet, Birmingham, have capacity for brass, gun metal and soft grey iron machine moulded repetition castings weighing 1-30 lb. Loose pattern work up to 3 cwt. Delivery by road to all parts. Tel.: B'ham, Victoria 0197. (P 570)

METALWORK. All types cabinets, chassis, racks, etc. to your own specifications.—Philpott's Metalworks Ltd., Chapman Street, Loughborough. (P 695)

ZEROS REFRIGERATORS. Complete range of REPAIR AND SERVICE now available. Equipment reconditioned to conform to pre-war manufacturers' specifications.—Time Engineers, Ltd., Refrigeration Specialists, 60 Southend Road, Rainham, Essex (Rainham 2358), or Southern Area Agency (Tel.: Springpark 4217). Electrical spares supplied to the trade. (R 372)

WANTED

A.C./D.C. MOTORS, STARTERS, complete change over installations, etc.—A.A. Electrical Co., Ltd., 67 Rothschild Road, Chiswick Park, W.4. Tel.: Chiswick 5105. (A 20)

ADVERTISER would purchase any quantity Burgess P.3 type MICRO SWITCHES and ½ in. ELECTRICAL CONDUIT.—Box No. 1633, Electrical Times. (S 35)

A 450-500 kVA ALTERNATOR AND EXCITER, 400/3/50 volts, 4 wire, at 375 r.p.m. A machine suitable for rewinding or conversion will also be considered.—Lewis Electric Motors, Moor Works, Maidenhead (2388). (R 474)

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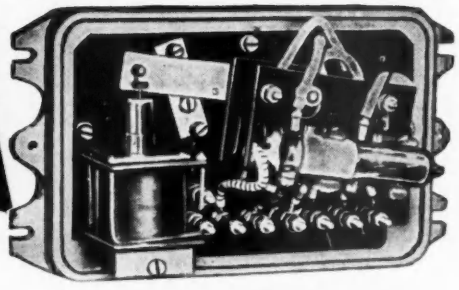

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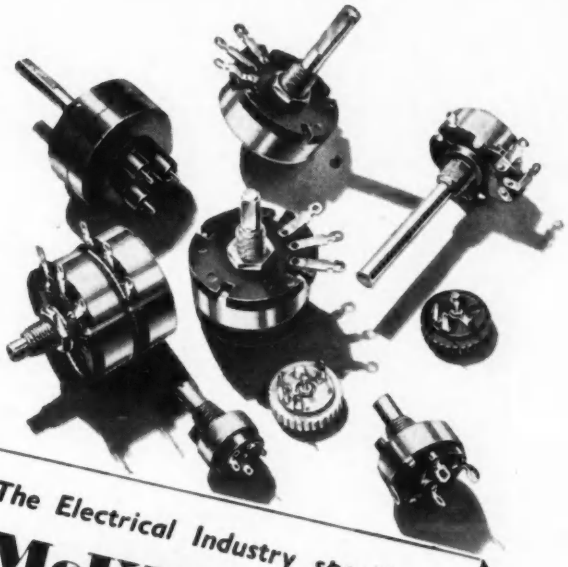

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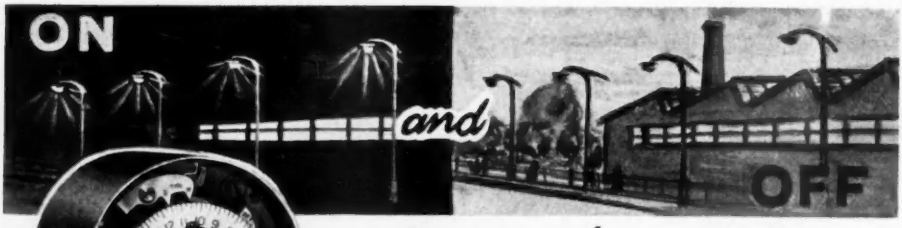

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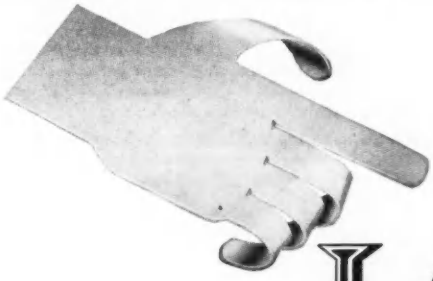

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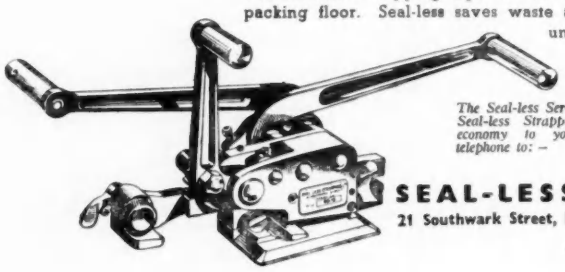

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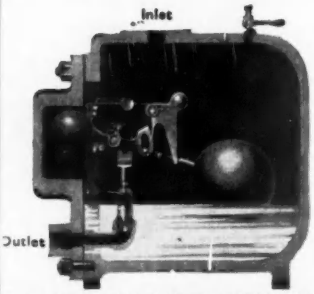

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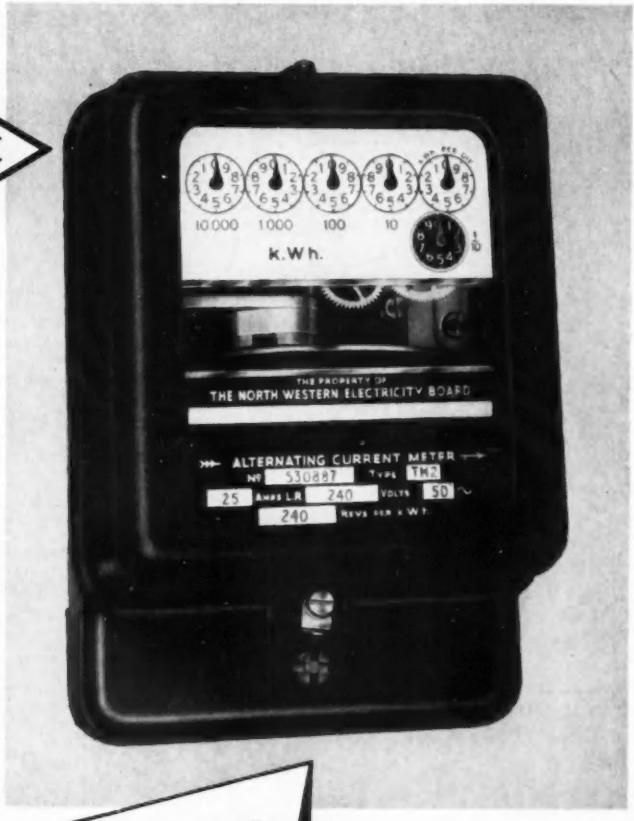

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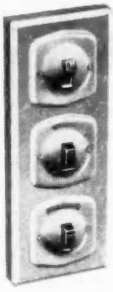

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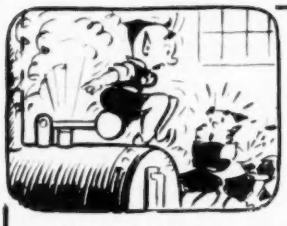

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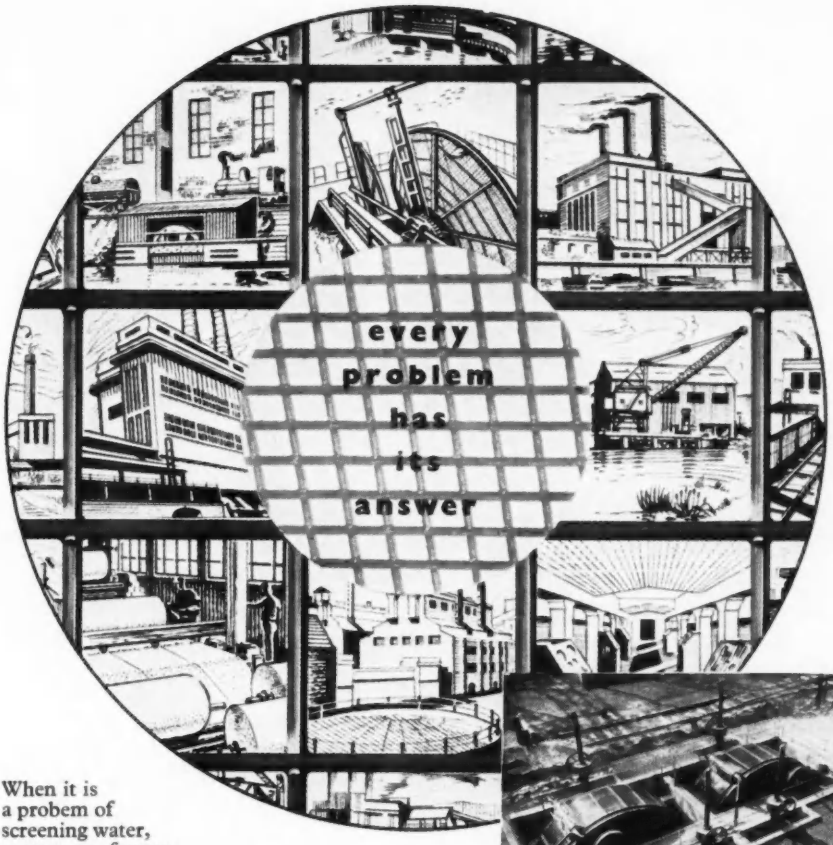

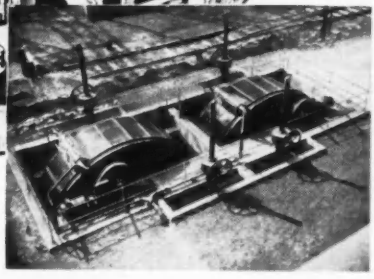

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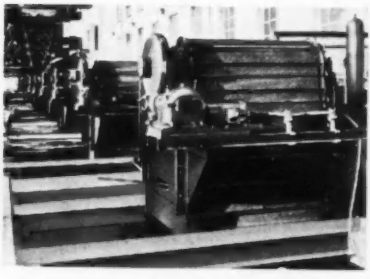

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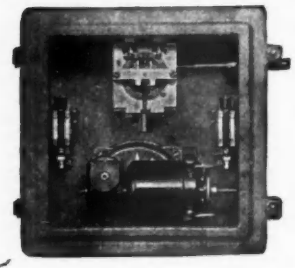

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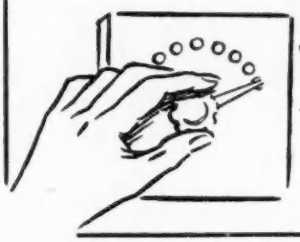

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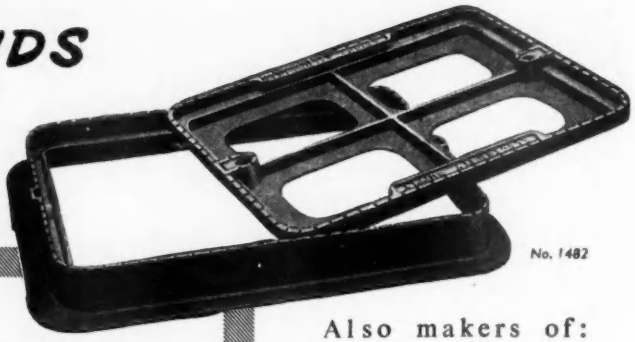

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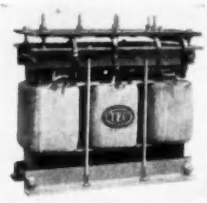

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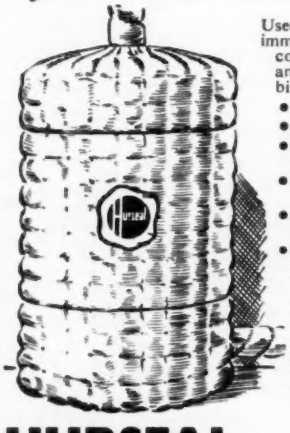

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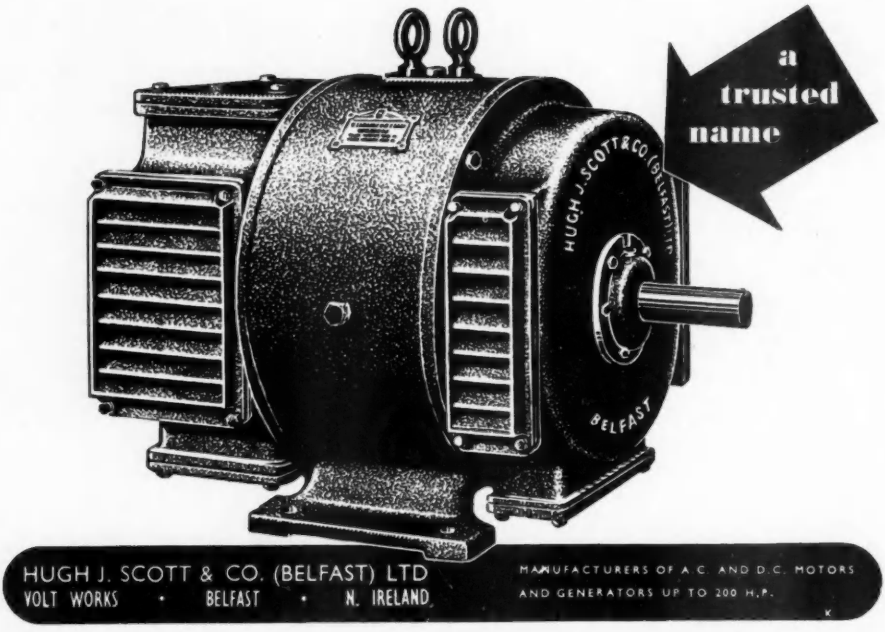
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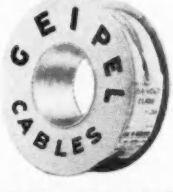

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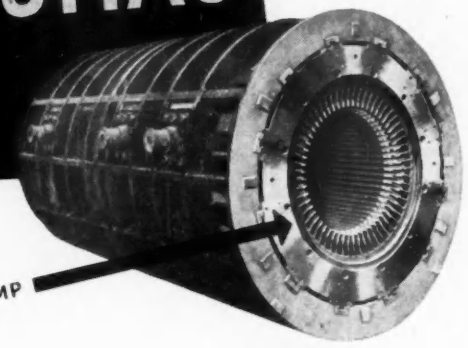

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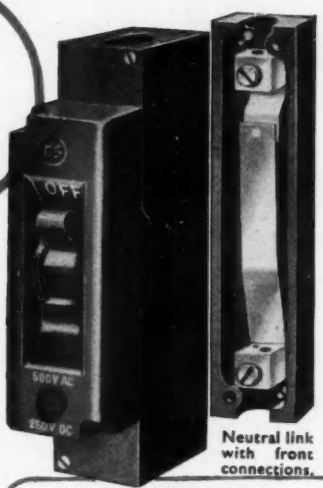

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